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THE RADIO AMATEUR'S JOURNAL

NEW

Digital DX-terity...

General coverage, Superior dynamic range, 2 VFO's, 8 memories, Scan, Notch...COMPACT!

TS-430S

The TS-430S combines the ultimate in compact styling with advanced circuit design and performance. An all solid-state SSB, CW, and AM transceiver, with FM optional, covering the 160-10 meter Amateur bands, it also incorporates a 150 kHz-30 MHz general coverage receiver having a superior dynamic range, dual digital VFO's, 8 memories, memory scan, programmable band scan, IF shift, notch filter, all-mode squelch, and built-in speech processor.

TS-430S FEATURES:

- **160-10 meter operation, with general coverage receiver**
  With 160-10 meter Amateur band coverage, including WARC 30, 17, and 12 meter bands, it also features a 150 kHz-30 MHz general coverage receiver. Innovative UP-conversion digital PLL circuit, for superior frequency stability and accuracy. UP/DOWN band switches for Amateur bands or 1-MHz steps across entire 150 kHz-30 MHz range. Two digital VFO's continuously tuneable from band to band. Band information output on rear panel.
- **USB, LSB, CW, AM, with optional FM**
  Operates on USB, LSB, CW, and AM, with optional FM, internally installed. AGC time constant automatically selected by mode.
- **Compact, lightweight design**
  Measures only 10-5/8 (270) W x 3-3/4 (96) H x 10-7/8 (275) D, inches (mm), weighs only 14.3 lbs. (6.5 kg.).
- **Superior receiver dynamic range**
  Use of 2SK125 junction-type FET's in the Dyna-Mix high sensitivity, balanced, direct mixer circuit provides superior dynamic range.
- **10-Hz step dual digital VFO's**
  10-Hz step dual digital VFO's operate independently, include band and mode information. Different band and mode cross-operation possible. Dial torque adjustable. STEP switch for tuning in 10-Hz or 100-Hz steps. A=B switch quickly shifts "B" VFO to the same frequency and mode as "A" VFO, or vice-versa. VFO LOCK switch provided. RIT control tunes VFO or memory. UP/DOWN manual scan possible using optional microphone.
- **Eight memories store frequency, mode, and band data**
  Memories store frequency, mode, and band data. Eighth memory stores receive and transmit frequencies independently. M.CH switch for operation of memory as independent VFO, or fixed frequency.
- **Lithium battery memory back-up**
  Estimated five-year life.
- **Memory scan**
  Scans memories in which data is stored.
- **Programmable automatic band scan**
  Scans programmed band width. Scan speed adjustable. HOLD switch interrupts band or memory scan.
- **IF shift circuit for minimum QRM.**
  IF passband may be moved to place interferring signals outside the passband, for best interference rejection.
- **Tuneable notch filter built-in**
  Deep, sharp, tuneable, audio notch filter.
- **Narrow-wide filter selection**
  NAR-WIDE switch for IF filter selection on SSB, CW, or AM, when optional filters are installed. (2.4 kHz IF filter built-in.)
- **Speech processor built-in**
  Improves intelligibility, increases average "talk-power."
- **Fluorescent tube digital display**
  Indicates frequency to 100 Hz (10 Hz modifiable).
- **All solid-state technology**
  Input rated 250 W PEP on SSB, 200 W DC on CW, 120 W on FM (optional), 60 W on AM. Built-in cooling fan, multi-circuit final protection. Operates on 12 VDC, or 120 VAC, or 220/240 VAC with optional PS-430 AC power supply.
- **All-mode squelch circuit, built-in**
- **Noise blanker, built-in**
- **RF attenuator (20 dB)**
- **Vox circuit, plus semi break-in with side-tone**

Optional accessories:

- PS-430 compact AC power supply.
- PS-30 or KPS-21 AC power supplies.
- SP-430 external speaker.
- MB-430 mobile mounting bracket.
- AT-130 compact antenna tuner, 80-10 m incl. WARC.
- AT-230 base antenna tuner, 160-10 m incl. WARC.
- FM-430 FM unit.
- YK-88C (500 Hz) or YK-88CN (270 Hz) CW filters.
- YK-88SN (1.8 kHz) narrow SSB filter.
- YK-88A (6 kHz) AM filter.
- MC-42S UP/DOWN hand microphone.
- MC-60A deluxe desk microphone, UP/DOWN switch.

More information on the TS-430S is available from all authorized dealers of Trio-Kenwood Communications, 1111 West Walnut Street, Compton, California 90220.

KENWOOD

...pacesetter in amateur radio

Specifications and prices are subject to change without notice or obligation.

TS-830S

"Top-notch"...VBT, notch, IF shift, wide dynamic range

The TS-830S has every conceivable operating feature built-in for 160-10 meters (including the three new bands). It combines a high dynamic range with variable bandwidth tuning (VBT), IF shift, and an IF notch filter, as well as very sharp filters in the 455-kHz second IF.

TS-830S FEATURES:

- LSB, USB, and CW on 160-10 meters, including the new 10, 18, and 24-MHz bands. Receives WWV on 10 MHz.
- Wide receiver dynamic range, Junction FETs in the balanced mixer, MOSFET RF amplifier at low level, and dual resonator for each band.
- Variable bandwidth tuning (VBT). Varies IF filter passband width.
- Notch filter high-Q active circuit in 455-kHz second IF.
- IF shift (passband tuning).
- Noise-blanker threshold level control.
- Built-in digital display, (fluorescent tube), with analog dial.
- 6146B final with RF negative feedback. Runs 220 W PEP (SSB)/180 W DC (CW) input on all bands.
- Built-in RF speech processor.
- Narrow/wide filter selection on CW.
- SSB monitor circuit.
- RIT and XIT (transmitter incremental tuning).

Optional accessories:

- SP-230 external speaker.
- VFO-230 external digital VFO with five memories, digital display.
- VFO-240 external analog VFO.
- AT-230 antenna tuner.
- YG-455C (500 Hz) or YG-455CN (250 Hz) CW filter for 455 kHz IF.
- YK-88C (500 Hz) or YK-88CN (270 Hz) CW filter for 8.83 MHz IF.
- KB-1 deluxe heavyweight knob.

TS-530S

"Cents-ational"...IF shift, digital display, narrow-wide filter switch

The TS-530S SSB/CW transceiver covers 160-10 meters using the latest, most advanced circuit technology, yet at an affordable price.

TS-530S FEATURES:

- 160-10 meters, LSB, USB, CW, all amateur frequencies, including new 10, 18, and 24 MHz bands. Receives WWV on 10 MHz.
- IF shift tunes out interfering signals.
- Built-in digital display (six digits, fluorescent tubes), with analog dial.
- Narrow/wide filter selector switch for CW and/or SSB.
- Built-in speech processor, for increased talk power.
- Wide receiver dynamic range, with greater immunity to overload.
- Two 6146B's in final, allows 220W PEP/180 W DC input on all bands.
- Advanced single-conversion PLL, for better stability, improved spurious characteristics.
- Adjustable noise-blanker, with front panel threshold control.
- RIT/XIT front panel control allows independent fine-tuning of receive or transmit frequencies.

Optional accessories:

- SP-230 external speaker with selectable audio filters.
- VFO-240 remote analog VFO.
- VFO-230 remote digital VFO.
- AT-230 antenna tuner/SWR/power meter.
- MC-50 desk microphone
- KB-1 deluxe VFO knob.
- YK-88C (500 Hz) or YK-88CN (270 Hz) CW filter.
- YK-88SN (1.8 kHz) narrow SSB filter.

TS-660

The TS-660 "QUAD BANDER" covers 6, 10, 12, 15 meters.

- FM, SSB (USB), CW, and AM
- Dual digital VFO's
- Digital display
- IF shift built-in
- 5 memories with memory scan
- UP/DOWN microphone
- All-mode squelch
- Noise blanker
- CW semi break-in/sidetone
- 10 W on SSB, CW, FM; 4 W on AM.

Optional accessories:

- PS-20 power supply
- VOX-4 speech processor/VOX
- SP-120 External speaker
- MB-100 Mobile mount
- YK-88C, YK-88CN CW filters
- YK-88A AM filter.

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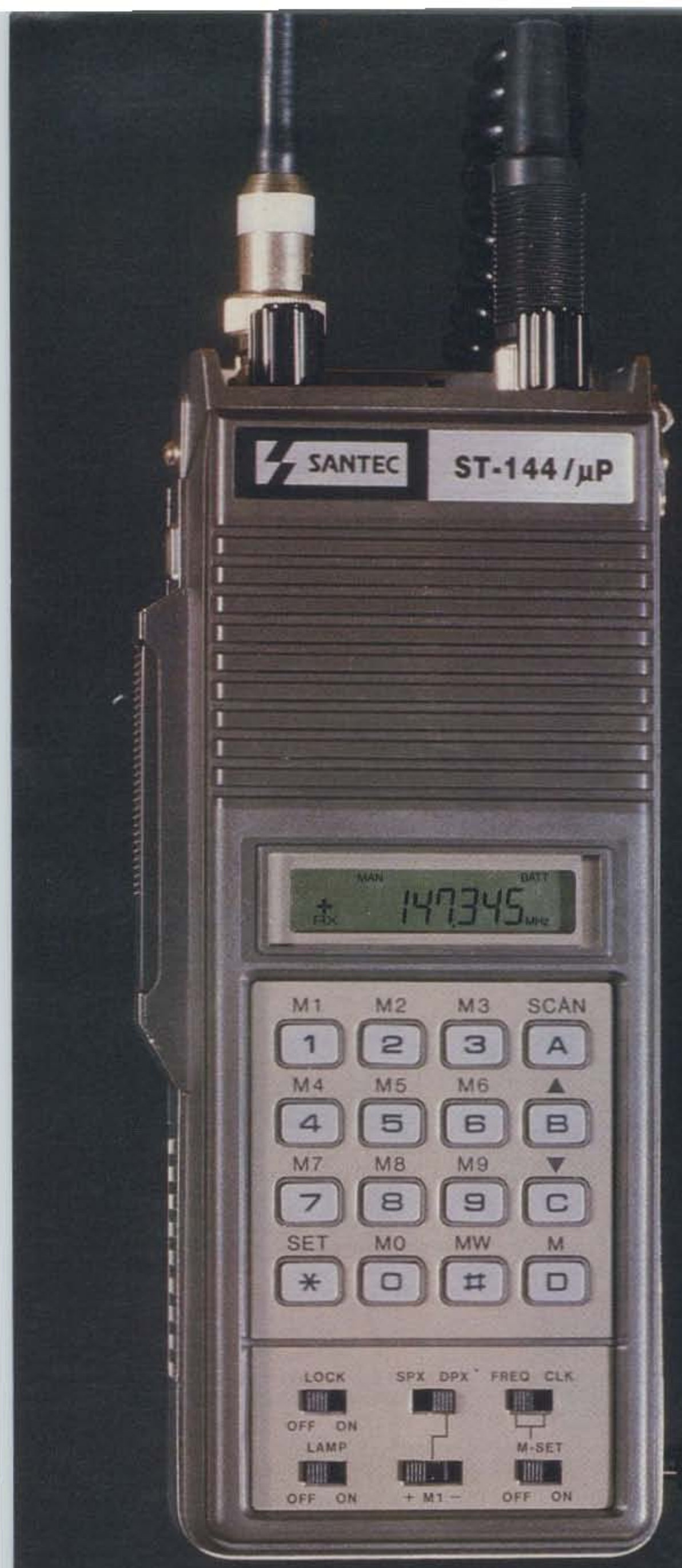

You've got to get a Santec to get it right!

Compare Santec to anything you like, and you'll see — you've got to get a Santec to get: ■ memory channels which store standard repeater offsets for instant recall ■ less than 10 ma drain in receive to conserve power while you're monitoring ■ extremely wide power options of 0.1 W, 1.0 W or even 3.5 W for varying conditions ■ an accurate 24 hour clock for instant reference ■ and a full two year extended service plan which no one else will match.

When you get a Santec, you also get: ■ the widest frequency range of any handheld ■ odd offsets other than ±600 kHz ■ variable step sizes in bandscan ■ a 500 ma battery with charger ■ a full six digit back-lighted LCD display for full frequency readout plus the memory channel number ■ the easiest keyboard entry of any handheld ■ eight modes of scan, search, manual control and open scan ■ the ability to change batteries without losing memory data ■ easily programmable bandscan ■ a frequency lock switch on the keyboard ■ an automatic low battery indicator ■ and much more.

FEATURE	SANTEC ST-144	YAESU FT-208	KENWOOD TR-2500
Size (mm)	68 x 170 x 47	61 x 168 x 49	66 x 168 x 40
Weight with Batt.	600 gm	720 gm	540 gm
Readout	LCD (full 6 digits)	LCD (4 digits)	LCD (4 digits)
Memory Channels	10	10	10
Memory of Offsets	YES	NO	NO
Memory Backup	YES, Capacitance	Yes, Lithium Batt.	Yes, Lithium Batt.
Scan (mem. & band)	YES	Yes	Yes
Search Mode	YES	NO	NO
Step Size	5-100 kHz	5 or 10 kHz only	Any 5kHz multiple
Battery	Quick Change Pack 500 ma-hr, 9.6 V	Quick Change Pack 450 ma-hr, 10.8 V	Slide-on Pack 400 ma-hr, 8.4 V
Frequency Coverage	142-148.995 Tx (149.995 optional) 142-149.995 Rx	143.5-148.495 Tx/Rx	143.9-148.995 Tx/Rx
Power (max)	3.5 W High 1.0 W Med. 0.1 W Low	2.5 W High 0.2 W Low	2.5 W High 3 W Low (approx.)
Priority	YES (in Mem/Scan)	Yes (Priority Ch.)	NO
Clock	YES	NO	NO
Computer Current Saver	YES (< 10 ma)	NO (20 ma)	NO (27 ma)
Display	6 Digits + Mem. #	4 Digits + Mem. #	4 Digits + Mem. #

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Competitors' specifications were obtained from published specifications sheets, and they are subject to change without notification to Santec or Encomm, Inc.

Shown with optional SM-3 speaker microphone.

Accessories for SANTEC Handheld Radios
clockwise from upper left
Leather Case (ST-LC)
Base Charger & Power Supply (ST-5BC)
Remote Speaker (MS-505)
Mobile Charger (ST-MC)
Speaker Microphone (SM-3)

The ST-144 µP is approved under FCC Part 15

SANTEC

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CQ The Radio Amateur's Journal

ON THE COVER: Barry Pesetsky, WD4EWV, makes some last-minute adjustments to his Jaybeam. He uses it maritime mobile aboard his sailboat, the *Sea Owl*. I guess the *Sea Owl* makes a nifty rotator. Photo by Larry Mulvehill, WB2ZPI.

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Zero Bias AN EDITORIAL

Well, another Dayton has bitten the dust, or drowned in mud. The view depends on just where you were during the weekend. The rains seemed to start when we arrived on Thursday morning, and they continued throughout the weekend. Yes, I did bring my raincoat and warm clothes to help fend off a bad weekend, but nothing could help that situation. I just seemed wise instead of superstitious.

The indoor area was packed as usual, and then some. The fleamarket people had about two good hours of no rain on Saturday afternoon. They needed the rain to cool their tempers, as the apparent changes in fleamarket times and methods of buying their table spaces were indeed a hardship on them. Amateurs who generally come only for the fleamarket came into the arena to dry off and looked in wonder as if to say, "How long has this been here?" The commercial exhibitors reaped the benefit of the bad weather by having all of these extra people examine their wares.

The attitude and feelings of the amateurs, and would-be-amateurs, was very high despite the weather, and it looked and felt like everyone went home with something. I did trudge out to the fleamarket (I had the raincoat) and found an old book I had been looking for. We had eight people at the *CQ* booth this year, and we really needed them all to handle the crowds. Besides me were Dick; Jack, Herb Pressman, and Arnie Sposato from our Advertising Dept.; Lew McCoy; and the two men from *CQ Radio Amateur* whom I spoke about last month: Carlos Rausa, EA3DFA, and Arturo Gabarnet, EA3CUC. For Carlos and Arturo this was a multiple first: first time in the U.S. and first Dayton show. They both bought cowboy hats so that they would look like typical Americans. Carlos did find a gem in the fleamarket, though; I guess haggling is a universal language. He picked up a D-104 and G stand in excellent condition for $10.00

Dayton also featured an attempt at a "volunteer" exam for amateur licenses. The project was conducted and engineered by the club and apparently went very well. John Johnston, W3BE, from the FCC's Private Radio Branch, and Ralph Haller, N4RH, Chief of the Research Branch of the Office of Science and Technology, monitored the exam. Over 600 people took amateur exams, and I'm glad to say that most passed.

What If?

The tragic death of DXers in the pursuit of DXing is always sad and always raises questions of judgment. It's unfair to abstract a comparison between dying when putting up an antenna or through an h.v. mishap, and dying thousands of miles from home. Granted, both parties are still dead, but there is a difference.

Diethelm Mueller, DJ4EI, and Gero Band, DJ3NG, have in a sense given their lives for amateur radio. I wouldn't call them heroes in the literal sense, nor would I attempt to lionize what the entire expedition tried to do. It was very dangerous, not in a philosophical or intellectual manner whereby the operators could run afoul of local law and risk the discomfort of a provincial jail, but in a real and tangible risk of death. Spratly environs have a recorded history of inhabitants who don't take kindly to strangers and shoot at them—not to scare, but to kill. The geopolitics are best left to those immediately concerned. It has clearly been demonstrated now that whatever there is that these factions want or claim is and should be taken very seriously. They have and will kill to protect their interests.

A few years ago it was a different kind of mishap that caused severe injuries to one DXer through a plane crash on Palmyra and subsequent injuries to another member of that DXpedition through a fall. Both will bear the scars and pain, but fortunately both are alive. Pirates on the high seas attacked another DXpedition. They too survived the incident relatively unscathed. In early 1966, Chuck Swain, K7LMU, and Ted Thorpe, ZL2AWJ, were killed during a storm at sea on their way to the Western and American Samoas. The three members of the crew of their 38 foot ketch were also killed, bringing the total of that tragedy to five dead. If you want to go back even earlier, dig out those hair-raising stories of the *Yasme* and Danny Weil. Danny sailed the seas on the *Yasme,* in fact several Yasmes. Most of them were sunk during storms or piled up on reefs with Danny narrowly escaping death on several occasions. It was exciting reading during the 50s.

Nothing will bring back any of these fallen amateurs, nor will these stories discourage others from trying to capture the thrill of amateur radio and adventure. I can't entirely second guess the motivation. I know that I'm probably a lot like you and far too sedate to actually want to try it myself. Thousands, however, do create pile-ups to work them and do enjoy reading about their exploits on these pages. I'm sure that all of this helps to fulfill in some the need to be in the spotlight, to be a part of the written history of amateur radio, and to stand out among one's fellow amateurs. We must all remember, however, that on these rare occasions our DX fantasies carry and extract a very high and extreme price. To die for one's country in some eyes is noble; to die for one's hobby is kind of hard to explain.

Ooops!

A lot of folks at Dayton commented on the great shot of a straight key in the WPX results printed in our May issue. It took quite a while to realize that I had inadvertently left off the photo credit line for the picture. It was taken by Joe Veras, N4QB, who has also done various *CQ* covers.

April seems to be the month for goofs. Our lead article on liquid crystal displays featured the Beckman designer kit. Prior to publication we were told that the kit was a standard item and that it would be in their line for some time. In fact, we were told that they would sell the kits directly to *CQ*'s readers. As luck would have it, Beckman decided to stop making them in April, and they have been returning customers' checks. I know it's not logical, but I still wonder why they were so helpful in preparing the article and then decided to discontinue the product.

How To Win Friends

The no-code proposal and the volunteer proposal have been linked in a sense by the ARRL. They have come out very strongly against the no-code license (which is no surprise) and have inferred that they are reconsidering taking part in the volunteer program if such a class of license goes through. It's consistent with membership wishes as interpreted by the League's Board of Directors. It's a hard stance and one that will win no friends at the FCC and probably strain relations with them. The recent attempt to circumvent the FCC by tacking a "reimbursement" provision for volunteer examiners on other legislation was killed. This, too, I would think could aggravate relationships. In some quarters it is known as "political suicide."

The proposals and existing regulations specifically prohibit money changing hands, fees, or anything faintly resembling "conflict of interest." It is blatently obvious that this is a "catch-22" situation, one seemingly designed *not* to have a happy solution. Present legislation also prohibits "earmarked" funds whereby a license fee pays for the expenses incurred. Perhaps this is the easiest legislation to change in the long run, and the one that will keep everyone reasonably happy. It is sort of obvious that Congress can designate an agency to have "earmarked" funds; the FAA for one has the right to collect *and use* license fees. While Congress might like to keep a strong control over the FCC (via funding), it just might be in the public interest to resolve this particular situation by keeping the power where it belongs. This is not a new thought. It's one that has been written about before both in *CQ* and elsewhere. Recently, though, I've received several letters in response to these editorials suggesting the same thing. Before we get into a philosophical blood-bath between Newington and the FCC, we should give this idea another try. Check with your Congressman and drop a letter to Sen. Goldwater. It might be worth another shot.

73, Alan, K2EEK

Say You Saw It In CQ

Introducing the hy-gain® EXPLORER 14

Remarkably Compact, High Performance Broadband Tribander with Quad-Band Option

New Para-Sleeve Design

The Explorer 14 is a new antenna design we call PARA-SLEEVE which uses an "open-sleeve" dipole optimized for maximum bandwidth and directivity. Here is the concept. A central dipole, driven directly by the transmission line, has a ½ wave resonance on the lowest operating frequency. Two shorter sleeve elements, tightly coupled to the central dipole, modify its impedance to create a ½ wave resonance to the highest operating frequency. This para-sleeve system is expanded by the addition of 15 meter traps and 20 meter element tips. A revolutionary new concept for HF tribanders. *So unique, we've applied for a patent.*

Broadband Performance

The Explorer 14 will load solid state tranceivers to maximum output with VSWR below 2:1, eliminating the need for an antenna tuner. You'll have edge to edge broadband performance on 20, 15 and 10 meters with gain and front-to-back ratio competitive to giant tribanders that cost twice as much or more. You'll be able to work stations you cannot even hear with a dipole antenna. And, the Explorer 14 handles maximum continuous legal power with a respectable safety margin.

Short Boom Save Space and Money

If your space or budget was too limited for a long boom tribander, chances are the Explorer 14 will fit both. The boom is only 14' (4.3 m) long and the turning radius requires only 17'3" (5.3 m). The compactness of the Explorer 14 reduces its overall weight and windload surface so you can mount it on a roof tripod, a mast or a tower. For Example, the Hy-Gain CD-45II rotator and HG52 tower are a perfect match for the Explorer 14. This saves you the cost of an extra heavy duty rotator and tower.

Superior Construction

The Explorer 14 includes passivated stainless steel hardware and heavy gauge, pre-formed element and mast brackets. High grade 6063-T832 thick wall swaged aluminum tubing is used throughout. A BN86 balun is included and a new Beta Multi-Match provides DC ground to reduce lightning hazard and precipitation static. It's a rugged, easily assembled antenna that survives winds to 100 mph (160 km/h).

Quad Band Option

You can add a fourth band, either 30 meters or 40 meters to the Explorer 14 with the QK-710 kit. A kit that attaches to the central dipole and is easily adjusted for either 30 meters (WARC) or 40 meters at minimal extra cost.

Lew McCoy, W1ICP, is among the most authoritative writers in amateur radio. For over 30 years he served on the ARRL technical staff with his last position as assistant senior technical editor. Presently he is the technical writer for CQ magazine. Here is what he had to say about the Explorer 14:

"In my opinion, with Explorer 14, Hy-Gain produced a truly high gain, high performance antenna in a small package. The "para-sleeve" design provides the amateur a whole new ball game, particularly in the area of broadbanding. I was really surprised when I actually verified the gain, front-to-back and bandwidth during my recent visit to the Hy-Gain labs and antenna range in Lincoln, Nebraska. The Explorer 14 is a winner."

Feed point and balun

Specifications:

Electrical

Frequencies of operation:	20M	15M	10M
Under 2:1 VSWR (MHz)	14.0-14.35	21.0-21.45	28.0-29.7
Maximum F/B Radio (dB)	27	27	21
Maximum Gain (dB)	7.5	8.0	8.0
Maximum Power		Maximum Legal DC Ground	

Mechanical

Boom Length	14'1½" (4.3 m)
Turning Radius	17'3" (5.3 m)
Net Weight	43 lbs. (19.5 kg)
Wind Surface Area	7.5 sq. ft. (.69m²)

TELEX® hy-gain®

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UPS SHIPPABLE

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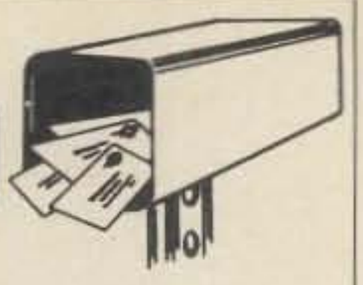
CIRCLE 9 ON READER SERVICE CARD

Our Readers Say



Can Anyone Help?

Editor, *CQ:*

For a long time I have been interested in amateur radio, but because of my hearing loss I had not been able to find a way to get into this area until I read your November '82 issue and noticed the articles on RTTY systems.

I am now seeking information as to licenses in the amateur radio field for handicapped people with my disability—without hearing. To your knowledge is there a way, any way, I could obtain the necessary license to operate? Also, I would like to obtain information on different types of equipment that would be used, and if there are any clubs or organizations that could help in information and other areas. I thank you for any help and information that you may send.

David C. Cox
P.O. Box 4039
Carson City, NV 89702-4039

And Now For Something Completely Different

Editor, *CQ:*

I recently read the Marc Roffman, WB2CUZ, article on using a plastic soda bottle to cover the coil on a Hy-Gain 18V ("The Two Liter Coil Cover," April 1983, *CQ*). It is a good idea that works.

There was one problem that I also solved with the 18V. Every time I wanted to change bands, it required a trip outside to the antenna with a screwdriver. The coil lug had to be loosened and moved to the desired spot on the coil and then carefully tightened down. After a few times of changing the lug, the coil would shift positions because of the pressure needed to tighten down the lug. Finally, the wire on top of the coil that is attached to the vertical element on the antenna broke because of the coil always having to be bent back into position.

To solve this problem and speed up the changing of bands, I removed the lug that connects to the coil and replaced it with a good conducting alligator clip. Then, after having already marked the band positions on the coil with a felt-tip pen, I soldered a piece of copper wire to the coil in each area that was marked for the desired bands. (I used stiff copper wire.)

Before soldering, I bent the copper wire to form a hook on one end, placed it over the desired spot on the coil, and squeezed it into place with a needle-nose pliers. I then soldered it into place. I left about ¾ inch of wire sticking out to connect the alligator clip to. (The coil turns are parted where the wire is soldered on so as not to touch any other coil turn.)

So now when I want to change bands on my vertical, I simply walk out to the antenna and move the alligator clip to the desired tap on the coil provided by the wire taps. I do monitor the s.w.r. at all times just in case the alligator clip is knocked off or moved on the coil, or in case Murphy's Law occurs. Hi!

William Maves, KC9VM
Menomonie, WI

In Consideration of True Mobiles

Editor, *CQ:*

I would like to urge all radio clubs who sponsor flea markets, auctions, club meetings, hamfests, or any other radio club events to mention in their announcements whether or not they are wheelchair accessible. It's very disconcerting to travel great distances and be greeted by stairs or other stumbling blocks to us hams who are real mobile stations on wheels.

Steve Rich, WA1DFL
Revere, MA

Safety First

Editor, *CQ:*

I must say that I was rather shocked after seeing the cover of the April 1983 issue of *CQ*. The proximity of K2UU's tower and antennas to the electric service weatherhead leaves a bit to be desired as far as safety is concerned. I'd like to refer all of your readers to Chapter 8 of the National Electrical Code, and most especially to Articles 800–11, 810–12, 810–16, 810–18, and 810–56, which outline the installation of radio transmitting and receiving equipment. A little common sense goes a long way!

Glen E. King, KB8QC
Cincinnati, OH

Learning the Questions

Editor, *CQ:*

Thanks for *CQ* and the features it gives to new amateurs like myself who are just getting their tired, old feet wet. Am 60, a ham since last summer, and just beginning to get smart enough to know what questions to ask when I get around those who know. I get *QST*, too, but have yet to find anything in it I can understand. Your staff does not always write so I can't understand (just part of the time).

Anyhow, I just wanted to say thanks for not forgetting that there is a whole bunch of us (at least I hope I'm not alone) out there who are not gifted electronic experts. I just want a good clean signal and to learn how to find someone on the other end to talk to.

John Rammel, KA9MNU
Cedarburg, WI

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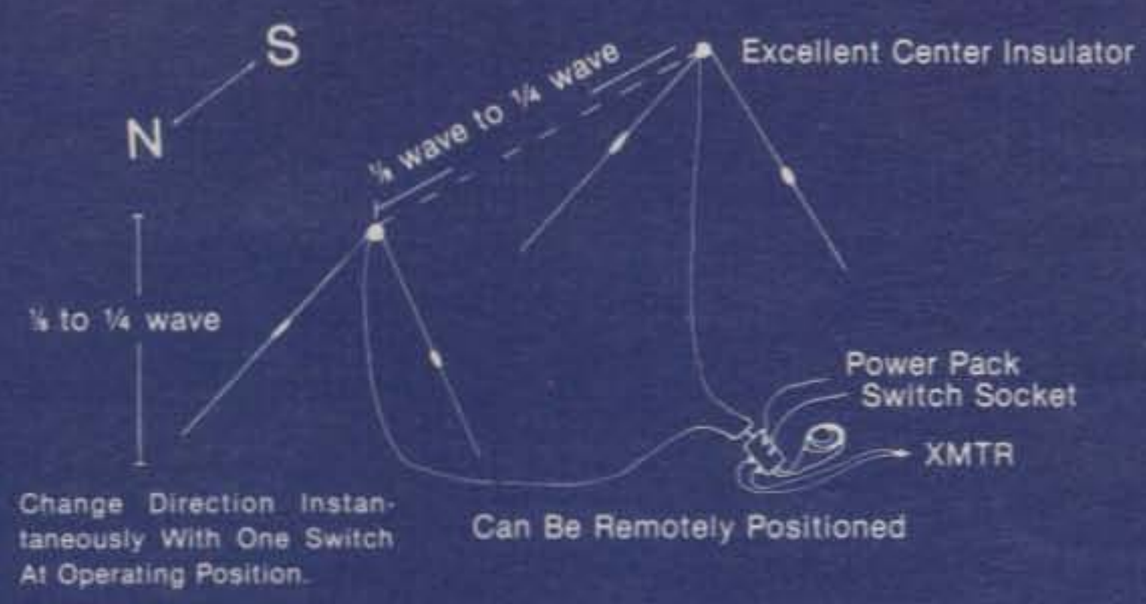

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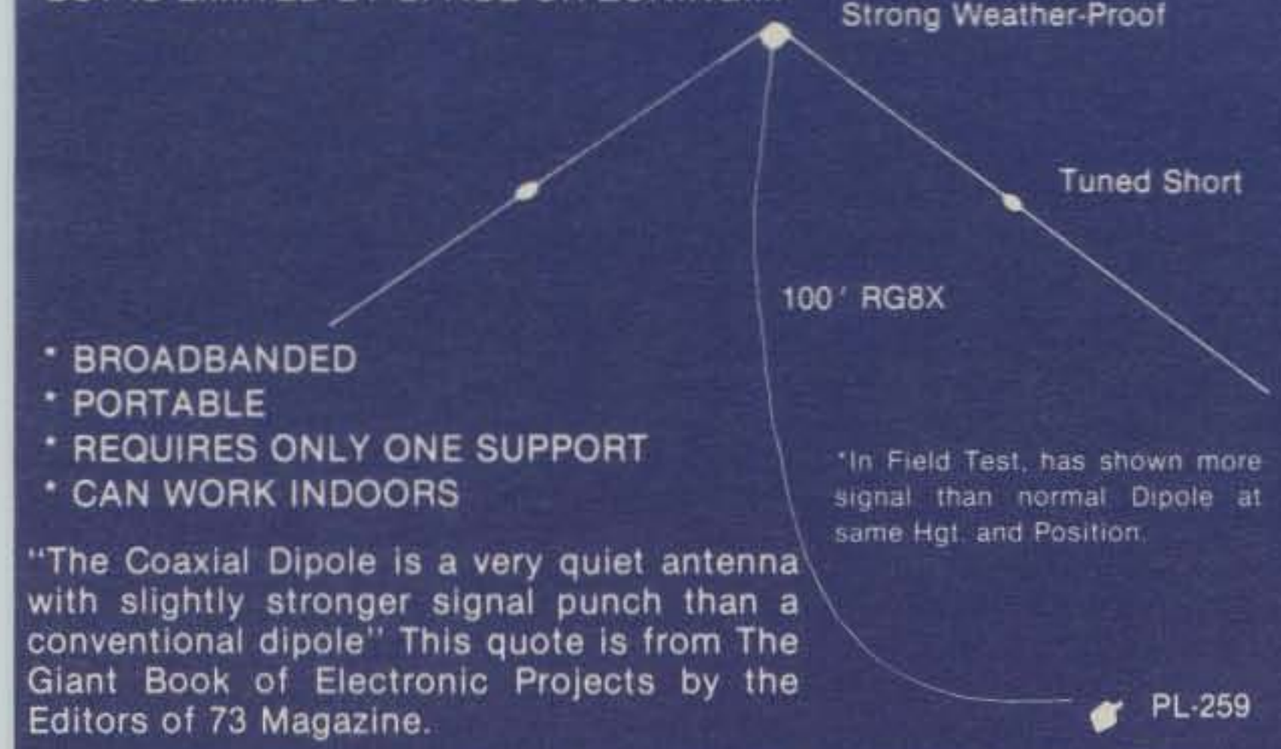

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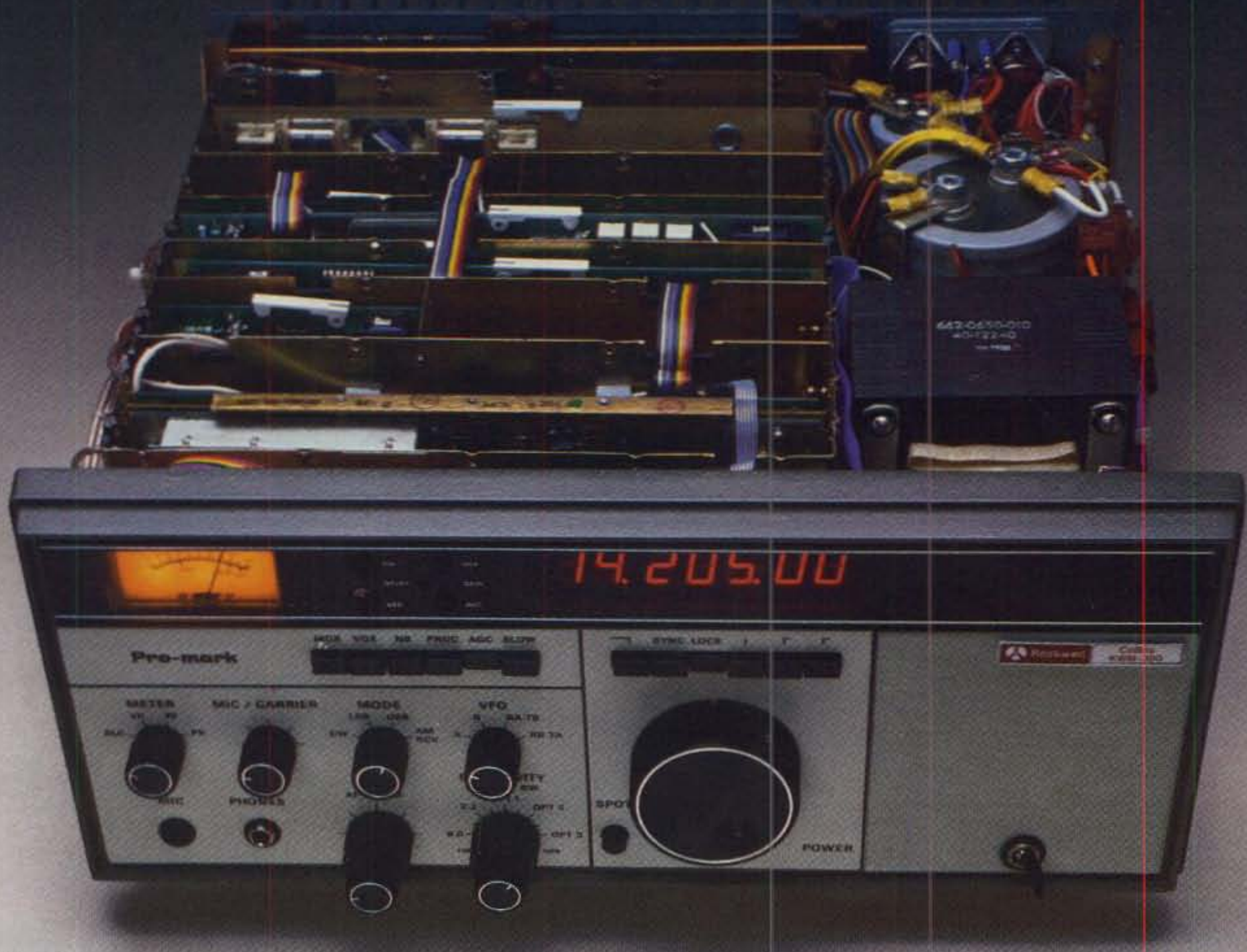

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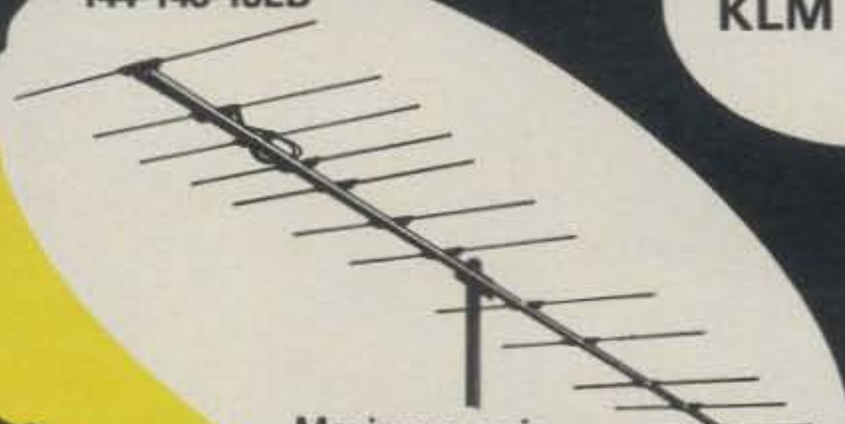

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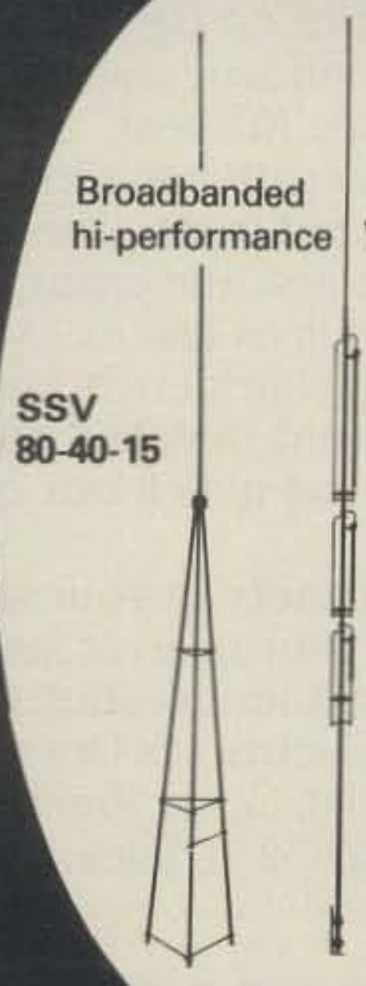

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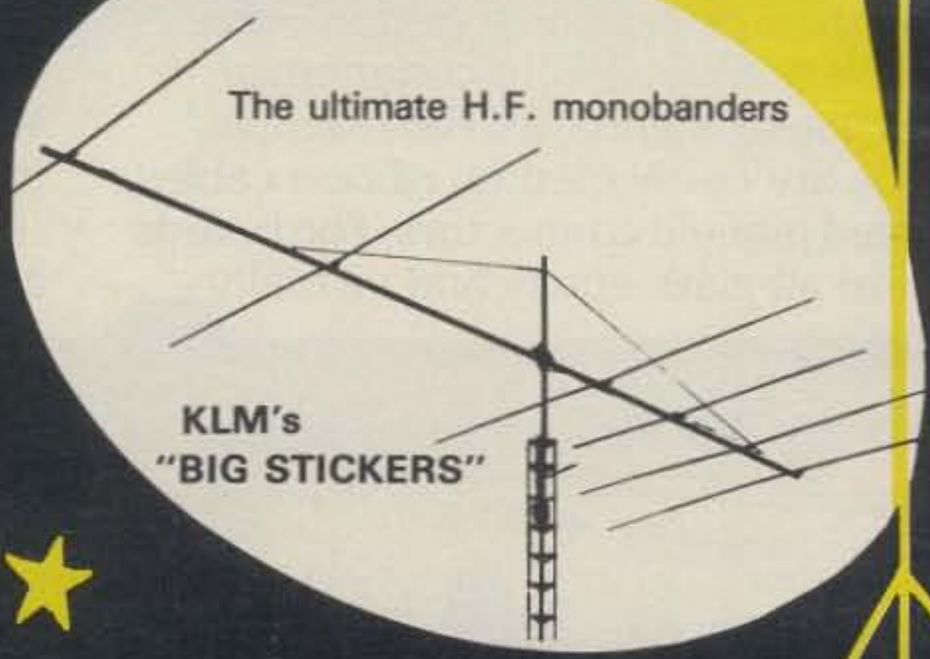

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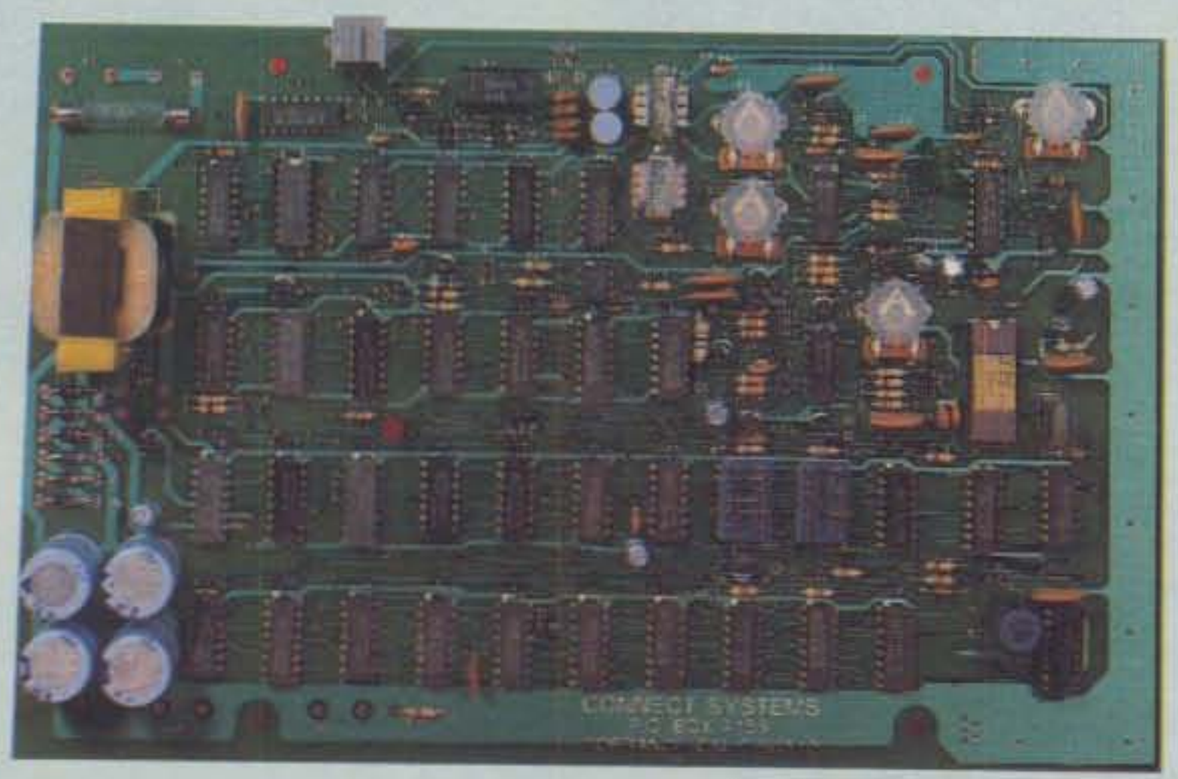

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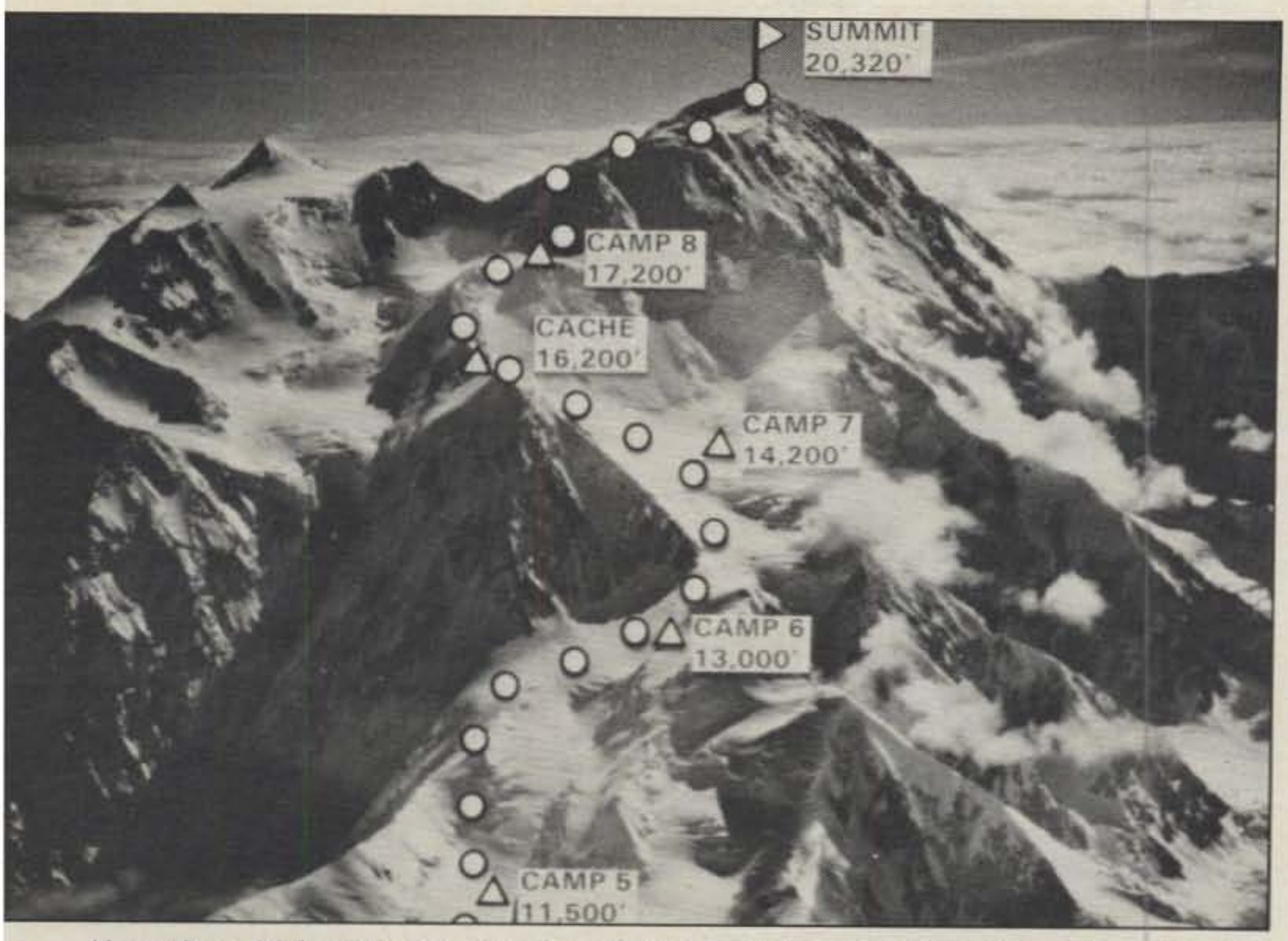


Not quite a AAA road map, this view of Mt. McKinley does show the route and camps used by the intrepid climbers.

At first glance this thermal wrap looks like an apron used for barbecuing. WA7SBG is shown at a warmer level ready to climb.

DXpeditions don't have to be h.f. treks to exotic steaming island jungles. Sometimes quite the opposite is true. WA7SBG took his HT and headed north . . . way north.

A TWO METER DXPEDITION TO MT. McKINLEY

BY BYRON D. ROBERTSON*, WA7SBG

The date is June 7, 1982. We have been trapped for four days in a snow cave at the 17,200 foot level on Mt. McKinley. There has been no food for almost five days. The temperature outside is 25° below zero; the wind is gusting to 100 miles per hour. For the first time since we became trapped by this spring storm, I am seriously beginning to wonder if I will get out alive. My fingers are numb as I shove the radio antenna through a hole in the cave roof. The weather report is for improving conditions. If we can only hang on a little longer!

Sound like a nightmare? It was. Sound like fiction? It wasn't!

In the spring of 1981, three friends and I decided to try to climb Mt. McKinley in Alaska. At 20,320 feet Mt. McKinley is the highest peak in North America. As experienced mountaineers, we anticipated the mountain would be a great challenge. I

At Camp 6 the clouds roll in like an ocean's surf hitting the beach.

*5002 Swallow Court, West Richland, WA 99352

am also an amateur radio operator, and I felt the climb would be a unique opportunity to combine my two favorite hobbies. Little did I realize that my decision to take a handheld 2 meter transceiver would be instrumental in a major rescue from the mountain.

Besides the normal climbing gear of ropes, food, snowshoes, and packs, I prepared my Yaesu FT-207R for cold-weather DX. Initially I experimented by leaving my handheld transceiver in the freezer for 24 hours. As was expected, the Nicad battery pack was very weak after this treatment, but the radio did work. For the next experiment I tried a home-brew Nicad pack of 12 volts/1.2 amp hour, which worked quite well. However, the battery pack was almost as big as the radio. Experiments with home-brew 12 volt alkaline battery packs were marginally successful. I did learn that at 5° below zero the volume knob on the FT-207 does not turn easily, although other controls appeared to function normally. I knew I would need a better battery, so I contacted the Altus Corporation (1610 Crane Court, San Jose, CA 95112) to obtain some lithium batteries. They generously donated three lithium batteries: two 15 volt/1.4 amp-hour units and one 15 volt/5.5 amp-hour unit.

The test results from freezing the lithium batteries brought quite a surprise: they were unaffected by cold temperature. That fact, combined with the small battery size (2½" × 2½" × ½"), made them a natural for expedition-type climbing. As a dyed-in-the-wool amateur, I decided to take all three types of batteries and compare them. In addition to batteries, I added a Vocom ⅝-wave whip and a BS-1 battery-saver kit by Engineering Consulting Service (P.O. Box 3966, Anaheim, CA 92803). The battery-saver kit significantly reduced battery drain in the memory and receiver mode.

The red medical tent. Antennas can be seen to the rear of the tent and the bank of solar panels to the right. The author was able to exchange a bit of traffic for a few volts.

The next step was to arrange a sked with an Anchorage ham who could help us with traffic. About this time an article in the January 1982 *73 Magazine* caught my attention. Through the article I learned that Ray Morris, KL7C, an amateur in Anchorage, was experienced in working with climbers on the mountain, and had a direct-couple patch which could crossband 2 meters to 20 meters. After a few QSO's we were all set. KL7C would anchor the northern end of our communications, and KA7GKW, KA7EBX, and WB7RJN would hold down the southern end and run phone patches.

The evening of May 14, 1982 arrived all too soon. The planning was done and we were on our way to Alaska. Ray Morris met us at the airport and took us to his house for the evening. The next morning, after some last-minute details, Ray took us to the train station and we were on our way to Talkeetna. Ray suggested I try calling Rosemary, KL7LA, when the train passed through Montana Creek, as she was also interested in the expedition.

In the coming weeks Rosemary monitored 146.52 and 147.90/30 for many hours. Many overdue climbers were very pleased that they could send reassuring notes to worried families anywhere in the U.S. through my ham radio and Rosemary. Later on when things got tough her voice gave us the reassurance we needed to keep going.

We met our bush pilot in Talkeetna, loaded up, and headed for Mt. McKinley. The 45 minute flight was spectacular. After clearing "one shot gap" by 800 feet, the Kahiltna Glacier lay like a glistening white highway before us.

A short, steep uphill landing on the northeast fork of the Kahiltna Glacier brought us to our base camp, Camp 1. At 7,200 feet we were directly below 14,000 foot Mt. Hunter and just a few miles from 19,000 foot Mt. Foraker. Directly behind us and 18 miles away rose McKinley. It was a magnificent view. However, it is also a most unlikely spot to attempt ham radio transmission and reception with 2 meter gear. Surprisingly, not only could I raise the Anchorage Repeater on 90/30,

This is what it looked like inside the medical tent.

Say You Saw It In CQ

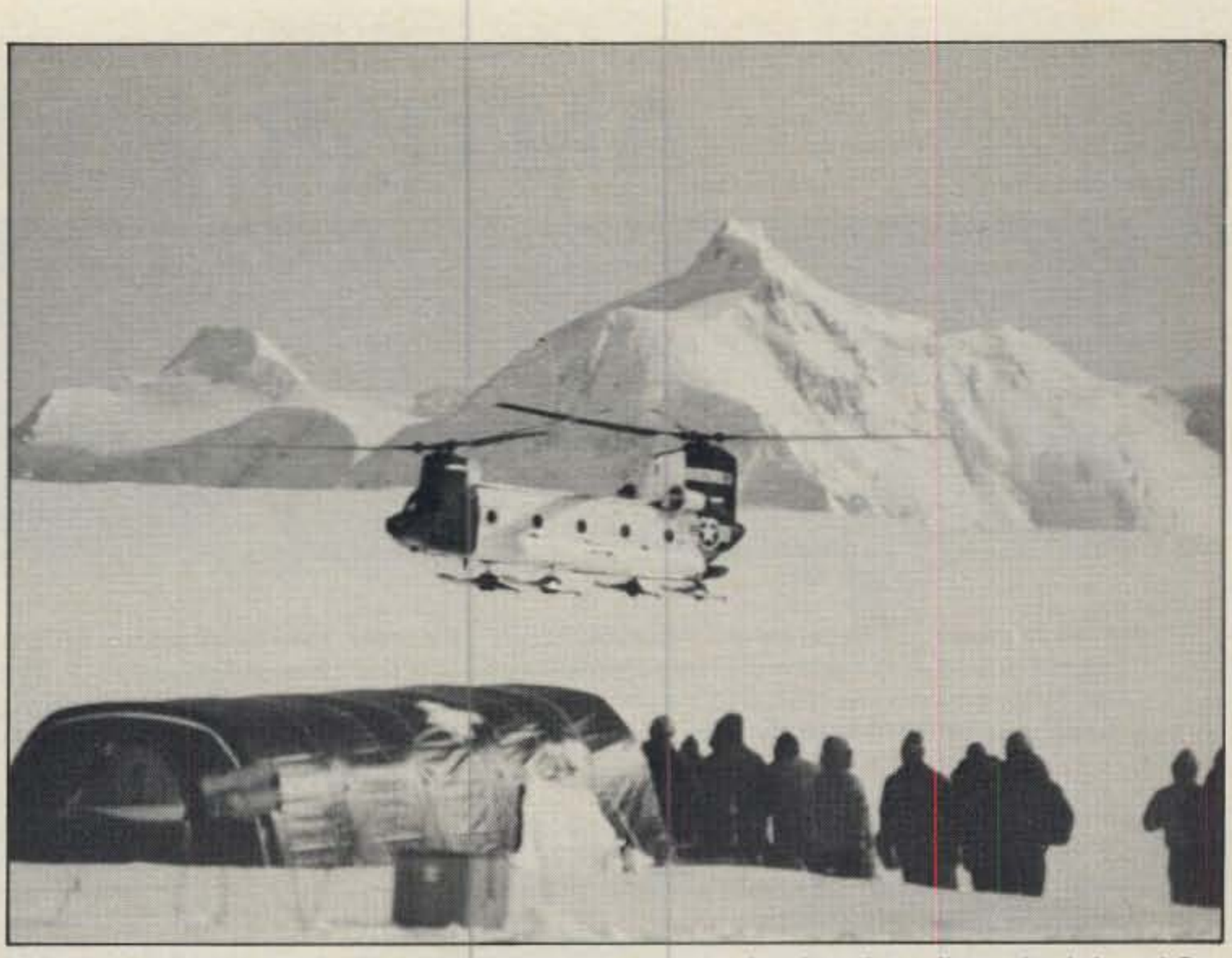
but I contacted Dick, KL7IS, who is located on the *other* side of Mt. McKinley, on 146.52 simplex!

For the next several days as we ascended the Kahiltna Glacier I could not raise the repeater, but I could still work KL7IS 75 miles away in Lake Minchumina on .52 simplex. KL7IS raised the 90/30 repeater and relayed traffic for us to KL7C. In this manner we were able to keep in touch with our families until we reached Camp 7 at 14,200 feet. At this point we could work the repeater ourselves. Daytime temperatures were in the 20° range, while at night the temperature lowered to 10° below zero. The only operating problem I encountered with the radio at this time was that my fingers would get quite numb as I talked. I found it was hard to work the radio controls with heavy gloves on, so I wore only the glove liners. As the temperature grew colder, the batteries began to weaken. The Yaesu Nicad pack died first, followed by both alkaline packs.

The weather grew worse as we shuttled our gear up to Camp 7 at the 14,200 foot level. Nighttime temperatures at this level were approximately 25° below zero. The only functioning batteries were the lithium units from Altus and the homebrew Nicad pack. Fortunately, at 14,200 feet a medical research team had set up a bank of solar panels to power certain medical experiments. When they found that I could run nightly phone patches to the "lower 48," they offered me the use of their solar panels in return for my handling traffic. This arrangement worked well and allowed for unlimited QSO's (as long as you could stand the cold!).

On the 26th of May a severe storm trapped a large group of German climbers at 17,200 feet. A young Englishman (Barney) fell off the West Buttress and was trapped at 16,000 feet. This spring storm lasted several days, during which time all of the tents of the trapped Germans were destroyed. Fortunately, a National Park Service Climbing Ranger was able to help the Germans dig a snow cave. Several lives would have been lost without the shelter of the cave. On May 27th I was asked by the doctors doing the medical research to call for help and set up an evacuation for the Germans who had badly frostbitten feet and hands. When Barney was brought into camp, he had frozen solid all ten fingers.

Working with Rosemary, KL7LA, I was able to make phone patches to Bob Gerhard, Director of Denali National Park, and several doctors in Anchorage who specialized in cold-weather injuries. The weather was still so bad, however, that the helicopters could not fly. Barney was in much pain and the Germans were still trapped. The situation was getting desperate! Via CB radio, the Germans were able to inform us that they would attempt a descent as soon as there was a break in the weather. I began passing on to the Germans the weather information which



A most welcome sight. The helicopter prepares to land and medivac the injured German climbers. The medical tent was located at Camp 7, 14,200 feet high.

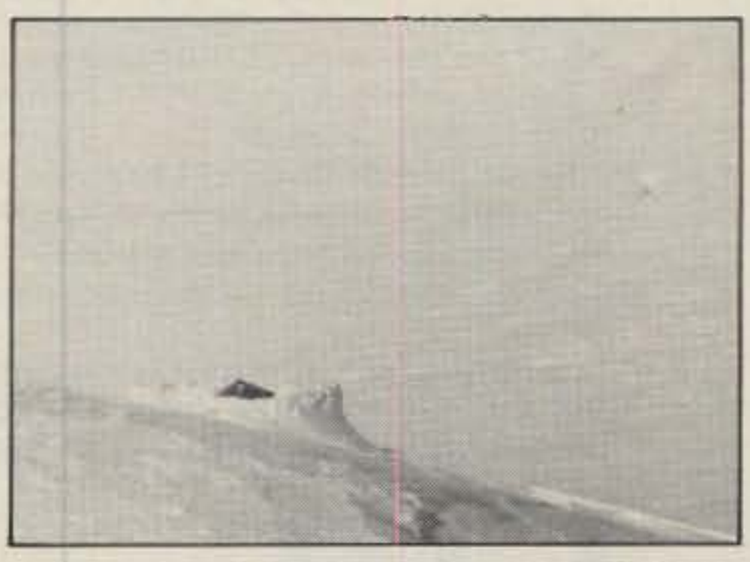
This is the view from the west buttress at 16,400 feet.

KL7C relayed to us from Anchorage. At this point ham radio was the only reliable means of communication off of the mountain. Finally, the weather report indicated a short break in the bad weather was coming, followed by more storm.

The next afternoon the weather cleared! The German team made a difficult and painful descent to the 14,000 foot level; five injured climbers were helicoptered off the mountain. The toll for that storm? Eighteen frozen fingers and toes and one broken neck. What had been planned as a fun summer outing had suddenly turned deadly serious. The next camp would be Camp 8 at 17,200 feet—the same place that the Germans had been trapped by the storm.

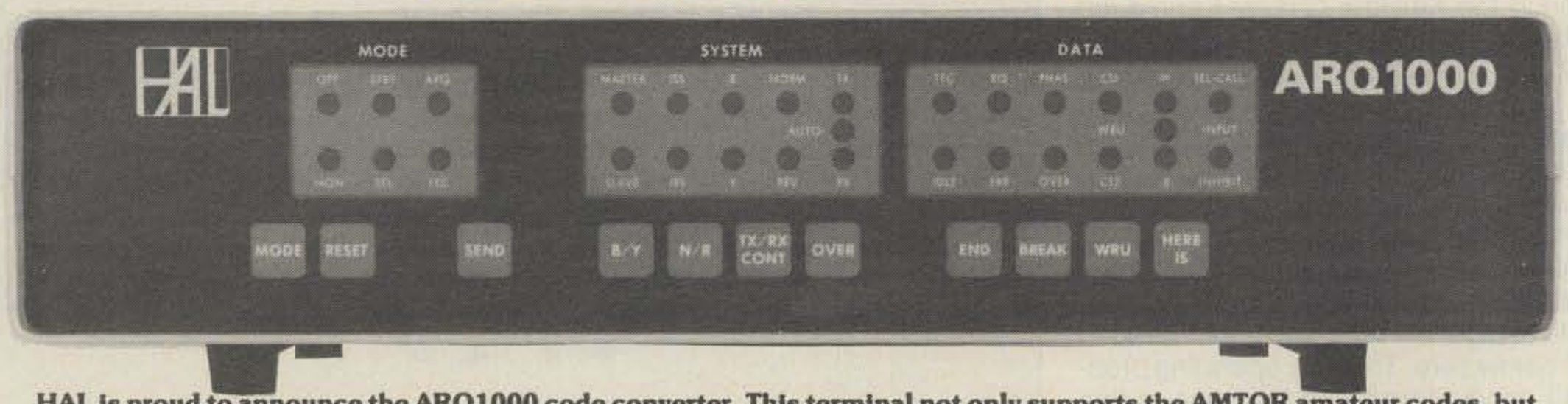
During the next several days we held on through another storm, and then began shuttling our loads higher up the mountain. Four days passed in this manner. The evening phone patches at 0400Z were looked forward to with anticipation by all of us. I passed on to KL7LA a lot of traffic from stranded climbers. Amateur radio became very popular! The temperature rarely got above zero then.

Finally on May 31, 1982, we got our chance to ascend to 17,200 feet, just 3000 feet below the summit. It was very hard work. We had two days food with us, since we planned to descend to our food cache at 16,200 feet the next day and return to Camp 8 at 17,200 feet that same evening. Despite our plans, we were not going to see that food cache for eight days. The weather forecast at the night's sked sounded very bad. The temperature that night reached 50° below zero! The next day brought zero visibility, whiteout, and blowing snow. The wind sounded like a freight train as it blew through Denali Pass 800 feet above us. We had to go outside to cut and pile snow blocks to a height of 6 feet around the tent to protect it. That night I could not raise the repeater, but had to work .52 simplex; this was just as well since the noise of the wind was unbelievable. Then the last Nicad pack "died." We now had only the lithium batteries; if we got into trouble, they were our only hope.



This is Camp 8, located at 17,200 feet. Here we dug in, building snow block walls around the tent, and waited out the storm. The tip of the tent sticks up from the snow escarpments like a turret in a medieval castle.

AMTOR RTTY



HAL is proud to announce the ARQ1000 code converter. This terminal not only supports the AMTOR amateur codes, but meets ALL of the commercial requirements of CCIR Recommendation 476-2. The ARQ1000 can be used with present and previous generation HAL RTTY products. In fact, any Baudot or ASCII full duplex terminal at data rates from 45 to 300 baud may be used with the ARQ1000. Some of the outstanding features of the ARQ1000 are:

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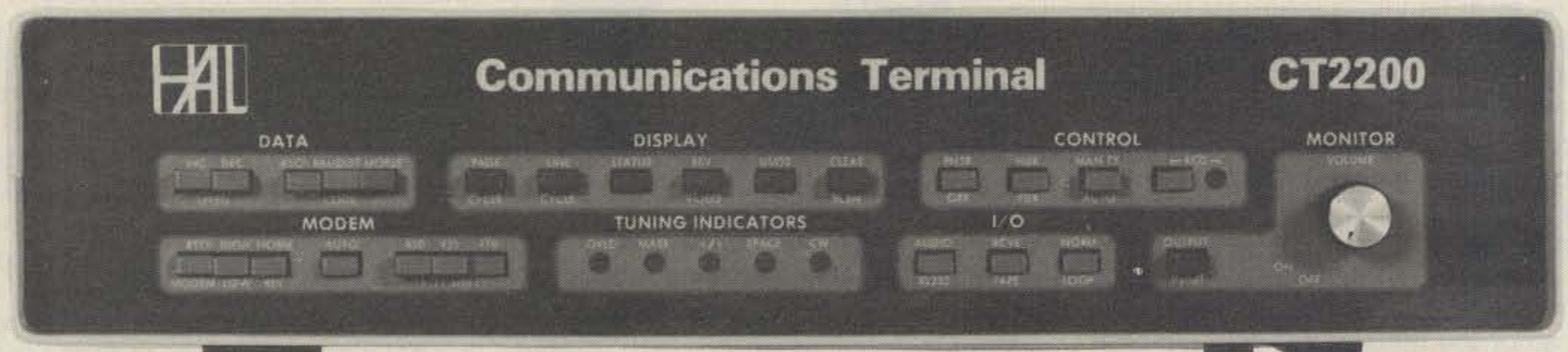

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CIRCLE 10 ON READER SERVICE CARD

Say You Saw It In CQ

Fortunately no one was hurt as our "rescue" plane tipped over on landing. After some minor repairs, the pilot deemed her airworthy and we were able to leave the next day.

This is what 2 meter DXing is like at 17,000 feet when the temperature is 20° below zero.

The wind continued for the next 24 hours. There was no possibility of sleep. We kept waiting for the tent to blow apart. We wore all of our gear all the time in case the tent was destroyed and we had to run to the German's cave. It was impossible to cook because the tent floor kept jumping up and down. That meant no food and no water. Whenever the wind eased we cut more snow blocks and shoveled snow out of the entrance to the cave — just in case.

Finally as we ran out of food the wind abated on the evening of the third day. We ran phone patches and got very important weather information. We would have 8 or 9 hours of "good weather" (wind 30 m.p.h., temperature 30° below zero), then more storm. Since it normally is 12 hours round trip to the summit from 17,200 feet, two of us decided it was just too dangerous. One man decided to go for it—solo. As we said goodbye, thoughts of the German party went through our heads. Was this the last time we would see our friend alive? The phone patches that evening took on a very somber tone. We tried to explain to family and friends why one man would try such a climb alone.

The next several hours were excruciating to us and to anxious amateurs listening for the next sked. We did not make that sked.

Our friend made it to the summit at 12:03 a.m., June 4th, and made it back to camp with the storm at his heels. We took down the tent and tried unsuccessfully to descend. The storm had caught us with all its fury. We blindly groped our way back to the 17,200 foot camp. With no hope of putting up the tent, we crawled into the Germans' cave. Now we were trapped just like them. We were out of food, low on fuel, and very cold. Our beards were full of ice, our hands were numb; one man had his face protector frozen to his face. There would be no radio contact that night.

The next night at the appointed time I poked a hole in the roof of the cave and shoved the Vocom whip up into the raging storm. I connected the lithium battery, crossed my fingers, and turned on the radio. Thank God it still worked! The only station I could raise was Florence, KL7DDB, (XYL of KL7IS) in Lake Minchumina. She relayed weather information for us and passed on our condition to KL7C. He passed it on to our families. They were both relieved that we were safe and were worried for our future. The storm continued for another day. The weather report was for more bad weather. For the first time we began to wonder if we would get out alive. We were scared. The next QSO with Florence I will remember the rest of my life. We told her our thoughts and our condition. She began to speak to us about her family, her home, her work, anything to take our minds off of the situation. She read to us out of *Time* magazine. She did everything she could to encourage us. My radio did not consume much power on receive so we just listened. She renewed our hope. We would not give up.

On day four of our internment in the cave the weather started to improve. We packed up and began our descent. We were very weak from lack of food and water when we finally reached the food cache we had left a week ago. We dug it out and struggled to drag it down to the 14,000 foot camp. We arrived at 14,200 feet exhausted. That evening, when we once again could make phone patches, there were tears in our eyes as we again heard the voices of wives and friends.

Unfortunately, the mountain was not finished with us yet. After a relatively easy descent to Camp 1 at 7,200 feet our problems began again. The weather socked in and our bush pilot was unable to fly in and pick us up. We were not worried because 25 days before we had buried five days worth of food and fuel beside the glacier airstrip in anticipation of possible bad weather.

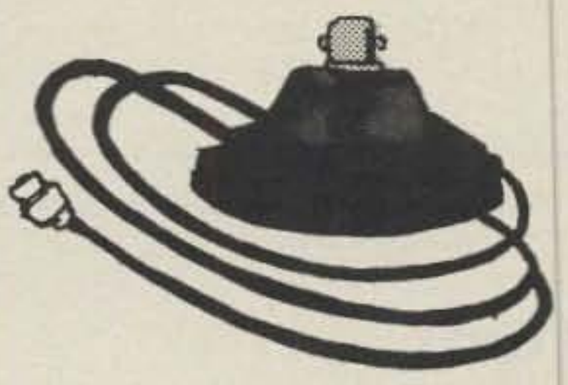
Now that the weather was unflyable and the forecast from KL7C was for more bad weather, the cache of food and fuel was critical. Unbeknownst to us someone had inadvertently moved the flag marking the cache to a new location. As we dug hole after hole in the snow our spirits dropped like rocks.

The bad-weather days began to pass and we got hungrier and hungrier. What else could go wrong? On the fourth day of waiting we got our answer. The clouds began to part and we heard a plane circling. As the pilot brought the ski plane in, one of the ski tips caught in the snow and the plane flipped right in front of our tent. The pilot was unhurt and the plane was only slightly damaged. The pilot said he could carry no passengers until the plane had been inspected for damage, so we went back to our tent to wait some more.

Day five of our wait at the glacier landing site dawned bright and sunny, and it looked like we would finally be able to leave this place where mother nature obviously did not like us. It was now June 14th and our plane was able to land safely. A quick call to KL7C and KL7LA let them know we were on our way.

I may have lost 23 pounds, but I gained a lot of good friends. Alaskan hams are the best there are. Would I do it again? Never! But I plan to keep my lithium batteries handy.

UP YOUR ERP



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CIRCLE 21 ON READER SERVICE CARD

When you try to auto-patch a call home from a busy expressway, does your car suddenly look like it is part of a movie chase scene? If you can punch up the numbers and still maintain control of the car even at night, then pass this article by; you obviously have a stuntman's license, too. AA9W has come up with a quick and safe way to make those calls.

Build Your Own Autodialer For V.H.F. Mobiling

BY EDWARD RATE*, AA9W

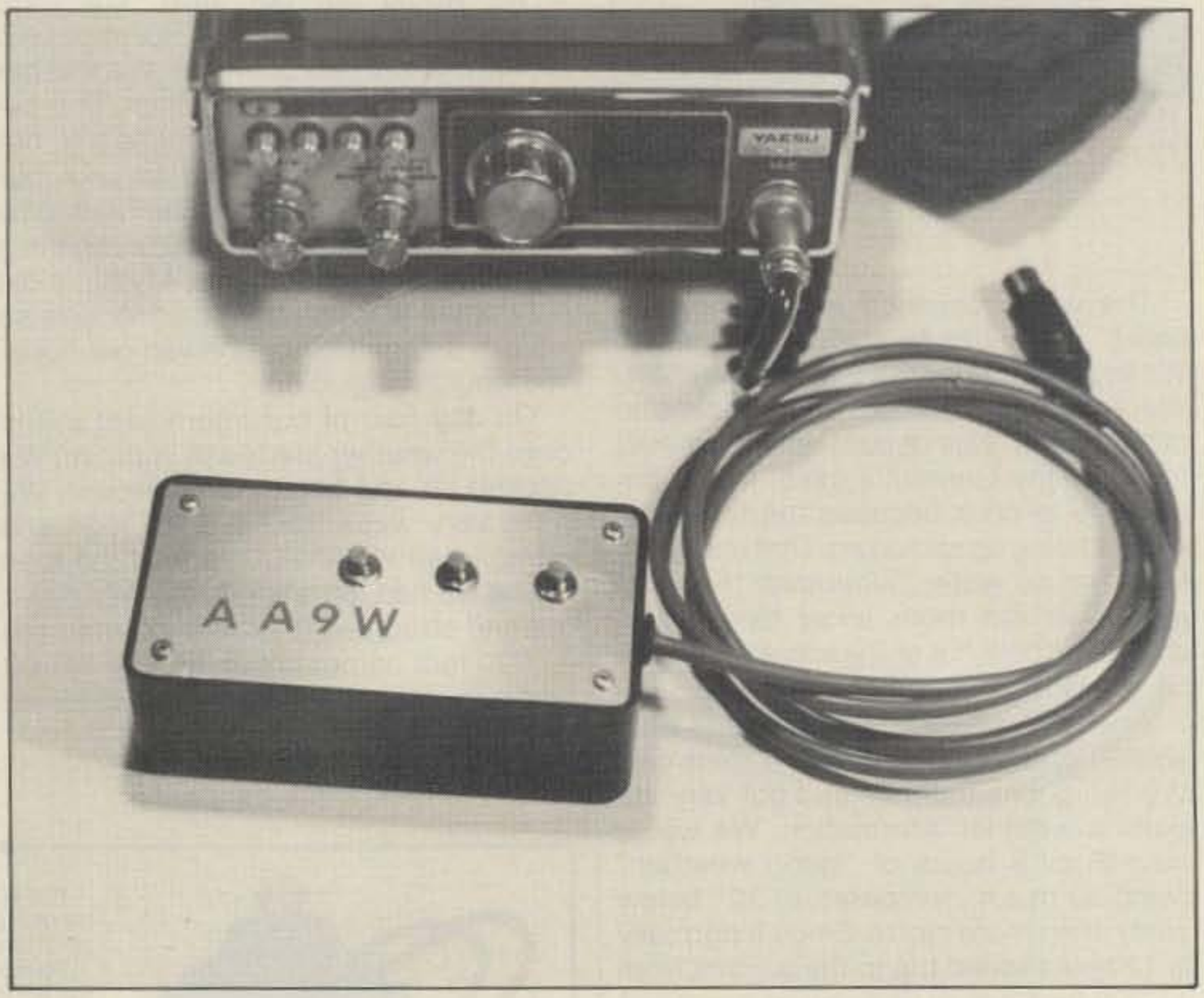
Punching tones through our repeater autopatch while navigating at highway speed can provide more excitement than I require. The usual result, with one eye on the road and one on the touchtone pad, is at least one wrong digit and a redial. Since it sometimes is not convenient to pull off the road to dial up, I designed and built this little mobile autodialer.

Most autopatch calls that I make are to my own home phone number. I suspect that most autopatch users also dial one phone number a majority of the time and would find this gadget a real joy to use.

Our club's repeater autopatch has a four-digit access code. In our telephone area, once the dial tone has been accessed, an additional digit provides extended ("Metro") area coverage for phone users. After the "Metro" line has been accessed, then the seven-digit phone number is dialed to reach your party. Trying to accomplish all this correctly the first time and stay on the road keeps the adrenaline pumping.

I had been thinking about designing an autodialer for some time, but had absolutely no experience in modern circuit construction techniques. Then the local Radio Shack store had a sale on a wire-wrap tool and I decided that it was time to learn what that was all about. What you see in this article is my first attempt at wire-wrap-type assembly. Most of the parts, including the cabinet, came from Radio Shack. The wire wrap used was the kind that makes contact through the insulation and does not require stripping. Absolutely no problem was encountered with this kind of wire, although I must admit that I was a little skeptical at first.

*9822 N. Andover Court, Mequon, WI 53092



Autodialer with its cable ready to plug into the back of the mobile rig.

How It Works

The AMI S2559 Digital Tone Generator Chip produces the two-tone signal for a digit when the combination of a single **row** input and a single **column** input are both raised up to the supply positive voltage level. All that is then required is to select pairs of *row* and *column* input lines in the appropriate sequence to produce the tones corresponding to the phone number desired. The switch that selects these inputs in order is the 4017 decade counter, which when triggered proceeds to count once through its ten-count sequence, with each output line going positive in turn, and then resets and stops. Because my dialing requires 12 digits, I used two 4017 IC's with separate button trigger switches (S1 and S3). The middle button (S2) when depressed simply applies positive supply voltage to the "Metro" *row* and *column* input lines for that single digit and may not be required for your location. The steering diodes provide voltage isolation between the 4017 decade counters and the S2559 tone generator.

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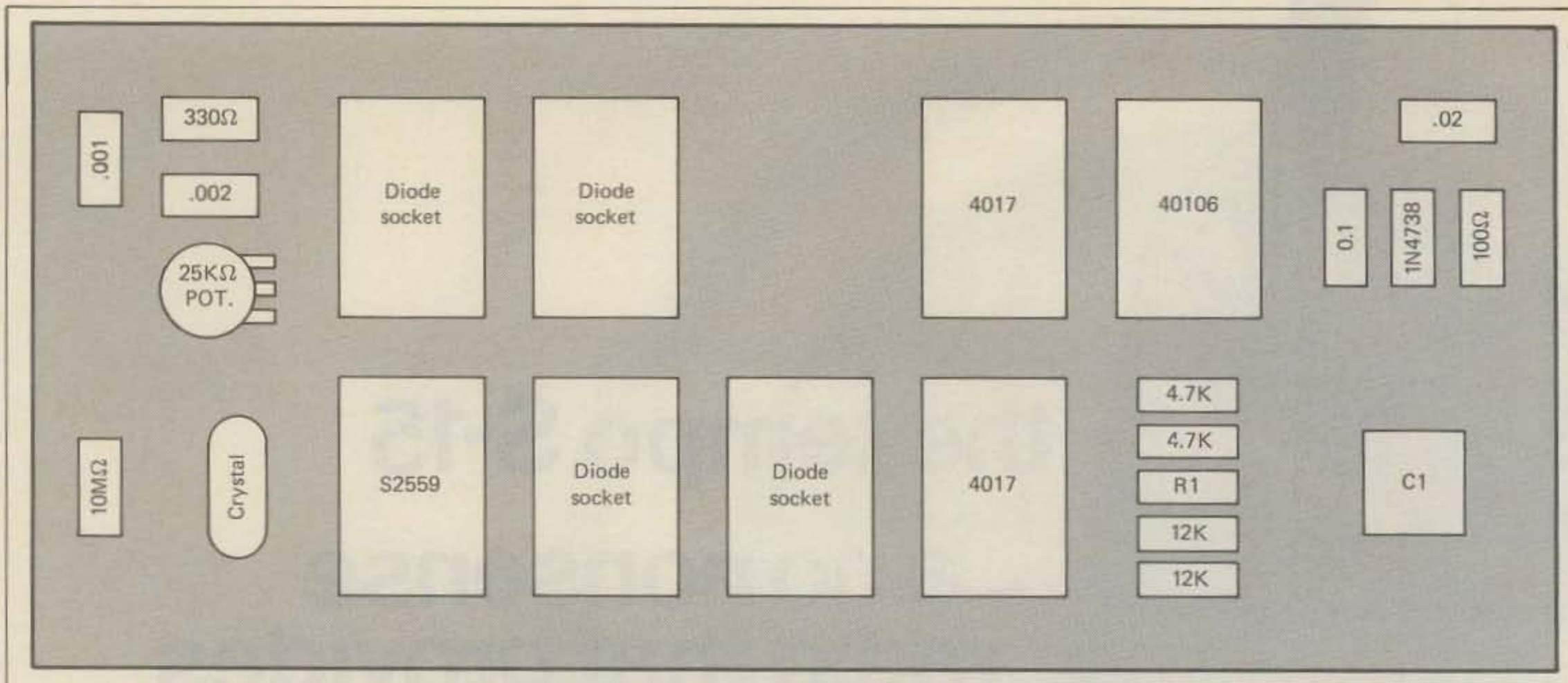


Fig. 1– Parts location for building the autodialer.

The decade counter's stepping speed is determined by the 40106 clock circuit. The 40106 is a Schmitt Trigger type inverter, which with the resistor R1 and capacitor C1 is about as simple a clock circuit as can be made. Increasing the size of the resistor slows down the speed of the dialer.

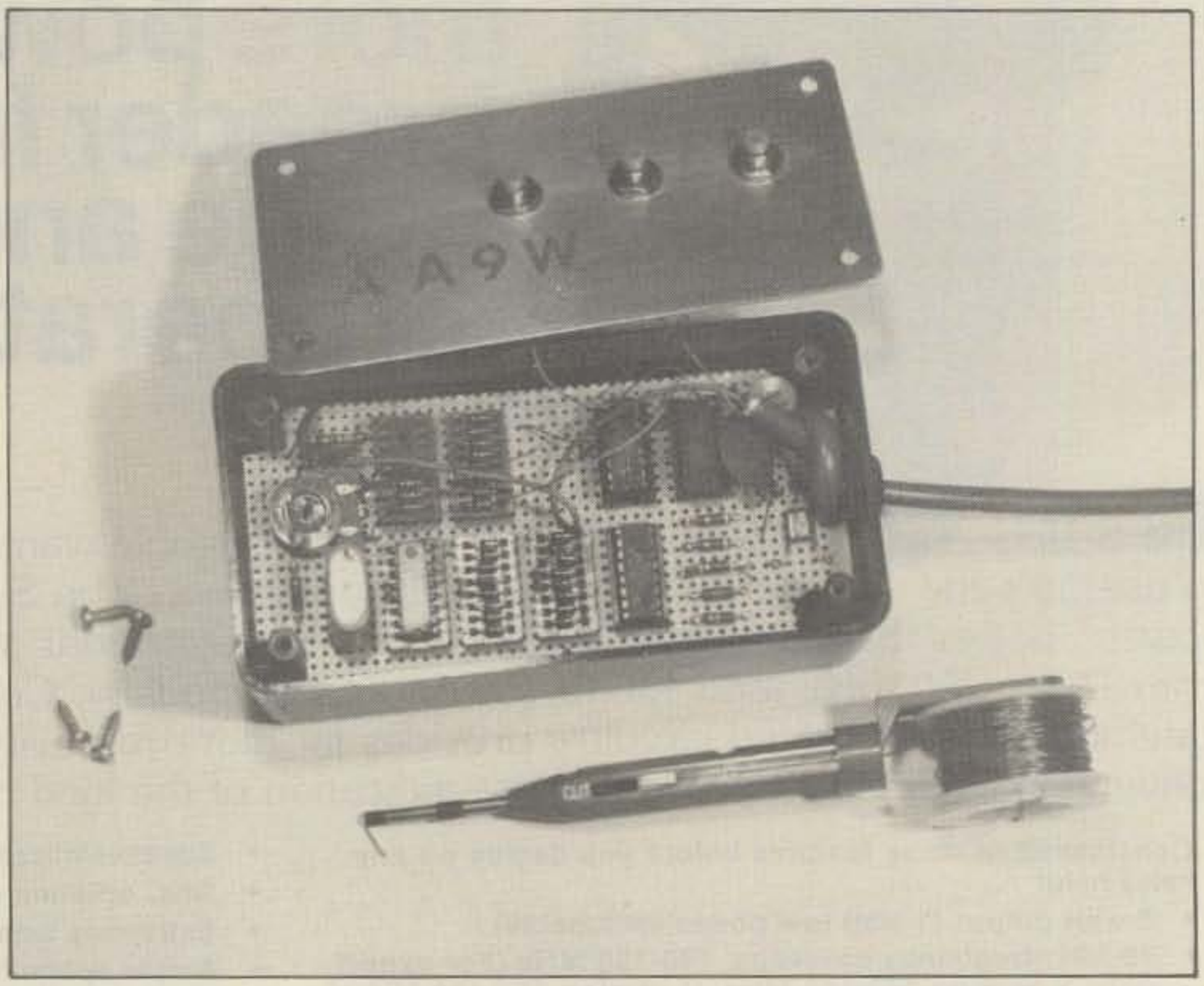
The crystal used with the S2559 chip is a standard TV color-burst type. The tone audio output level is adjusted for proper deviation by the 25K ohm pot. The 0.001 mFd capacitor across the output is there to shunt any r.f. pickup on the connecting cable to ground.

The S2559 IC comes in several versions (S2559A, B, C, or D), and all are suitable in this circuit. It is very important in a mobile application like this that variations in input line voltage not be allowed to exceed the rated voltage of the chips. This chore is handled by the zener diode 1N4738, which limits the maximum applied voltage to about 8 volts.

Construction

The circuit is assembled using wire-wrap sockets and push-in pins on a perforated board. Two small blocks support the perf board at each end so that the pins do not bottom in the Radio Shack box. Fig. 1 and the interior view show the parts layout. The crystal is simply plugged through the perf board and glued in place with solder connections made on the underside. For ease in keeping track for wire wrap, the diodes were plugged into the IC sockets with anodes all facing in one direction. A sketch of the part locations was made as viewed from the wire-wrap side so that during assembly I did not have to keep turning over the board to see where the wraps were to go.

The shielded cable used for tone audio output and power connection is standard three-conductor microphone cable. No other connections to the dialer are required.



View of the autodialer with the cover open to show the parts layout. Switch S1 is on the side nearest the cable.

If the "Metro" service is not available at your repeater location, then eliminate from the circuit switch S2 and its two steering diodes.

Programming the Dialer

The access code and phone number are hardwired in by wire wrap. Table I is used to set up the sequence desired. As an example, fig. 2 is wired showing a two-digit autopatch access code (*1), the "Metro" access digit (7), and a seven-digit phone number (242-33#8). Note that if in the desired sequence two consecutive digits are identical, then a space must be programmed in between the identical digits. The space is required so that the autopatch can sense that two separate digits were transmitted. The 4017 switches step output in pin connection order 2, 4, 7, 10, 1, 5, 6, 9, 11. Note that only nine outputs are available for digits on each switch in this circuit, but the 18 total should be more than enough for most situations. Check out your own digit sequence before starting this project to make sure that your own particular phone dialing sequence will fit the available stepping sequence slots. When you have determined the appropriate row and column input sequence desired, a table should be prepared and saved so that

Say You Saw It In CQ

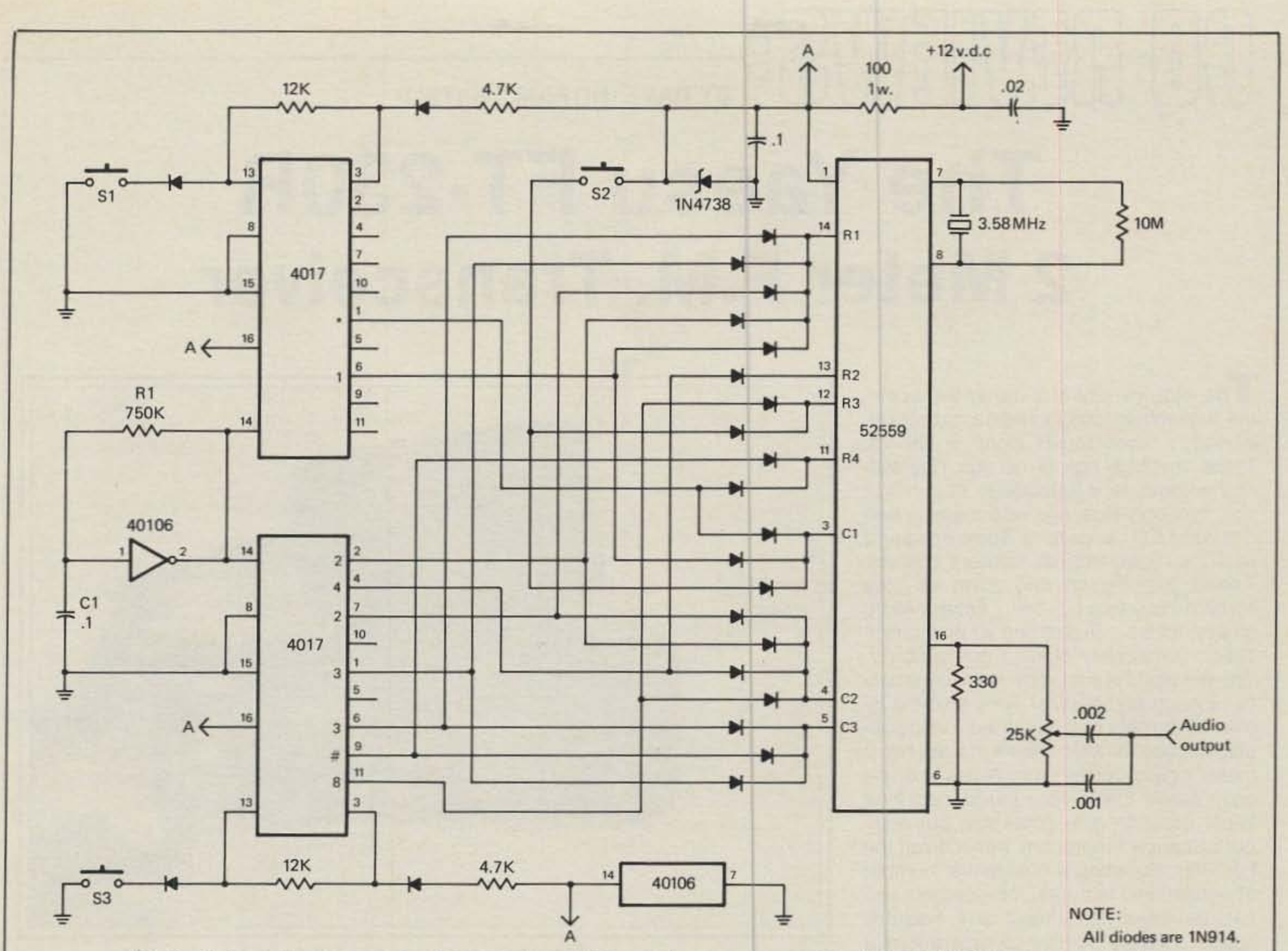


*Fig. 2– Schematic diagram for the autodialer. This one is programmed for *-1-7-242-33#8 as an example.*

Digit	Row	Column
1	R1	C1
2	R1	C2
3	R1	C3
4	R2	C1
5	R2	C2
6	R2	C3
7	R3	C1
8	R3	C2
9	R3	C3
*	R4	C1
0	R4	C2
#	R4	C3

Table I– Row and column connections required for programming.

when your club changes its access code, you will be able to easily make the change in your autodialer.

Operation of the Dialer

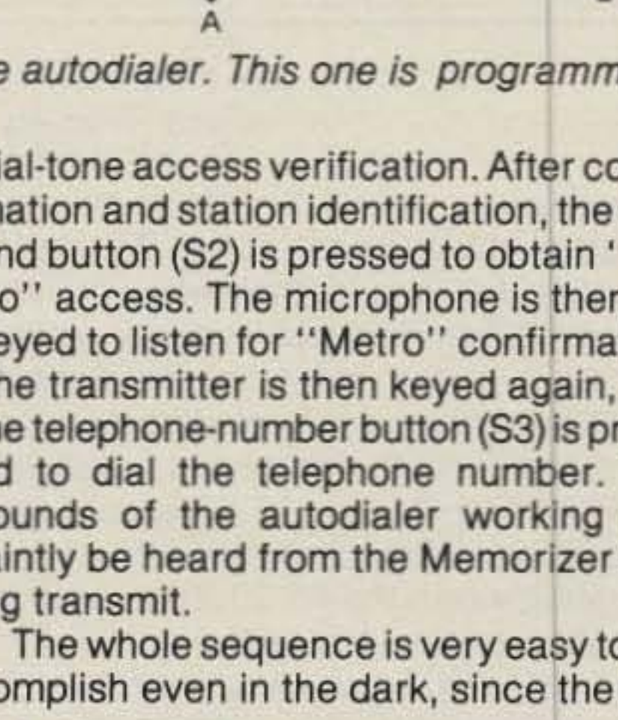
The cable plugs directly into the accessory jack of my Yaesu Memorizer FT-227R. No internal wiring was required in the Memorizer, since Yaesu thoughtfully provided power and microphone input lines at the jack. Other rigs, however, may require adding an accessory jack.

To access the autopatch, the transmitter is keyed, the first button (S1) is pushed, and the access code is automatically transmitted. The transmit switch on the microphone is then released to listen for dial-tone access verification. After confirmation and station identification, the second button (S2) is pressed to obtain "Metro" access. The microphone is then unkeyed to listen for "Metro" confirmation. The transmitter is then keyed again, and the telephone-number button (S3) is pressed to dial the telephone number. The sounds of the autodialer working can faintly be heard from the Memorizer during transmit.

The whole sequence is very easy to accomplish even in the dark, since the buttons are in line and only one hand is required to key the transmitter and start each sequence at the same time.

Conclusion

I have used the autodialer in my mobile station for about a year now without experiencing any problems. The only disadvantage I can think of is that I tend to forget the club's autopatch access code because I use the dialer to access (first button only) even when I use my regular touch-tone pad. *Drive carefully!*



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BY DAVE INGRAM*, K4TWJ

The Yaesu FT-230R
2 Meter F.M. Transceiver

The wide variety of 2 meter transceivers available to today's radio amateurs is, indeed, a spectacular sight to behold. There are large rigs, small rigs, rigs with and without tone encoders, multimode rigs, f.m.-only rigs, rigs with meters, and rigs with LED bar-graphs. Some beep and flash their lights from distributors' shelves, literally jumping up and down as they scream "buy me, buy me." Others sit by quietly, their small size and air of sophistication seductively piquing our curiosity. Yes, the world of v.h.f. gear is an extremely fascinating and popular area enjoyed by over 60 percent of the amateur radio population, most of which owns at least two 2 meter rigs of some type. A few months ago, Yaesu Electronics introduced their latest creation in a small-size but high-performance 2 meter f.m. transceiver: the FT-230R. Boasting a substantial number of outstanding features, this compact unit can be fitted into almost any available space, a very attractive consideration for owners of compact cars.

Sporting a dazzling array of special features, Yaesu's FT-230R 2 meter f.m. transceiver offers 25 watts in a very compact package.

The FT-230R uses microprocessor control for tuning the frequency range of 144.00 to 147.995 MHz in either 5 kHz or 10 kHz steps, and for storing/scanning frequencies entered into the unit's 10 memories. Dual v.f.o.'s are included, along with front-panel selection of **VFO A** or **VFO B** as desired. This will allow, for example, one v.f.o. to be used during conventional operating and other v.f.o. to be employed when band scanning or looking for new repeaters. Control of frequency and/or memory stepping or scanning is achieved by up and down buttons on the microphone: single taps cause stepping, while a 1 or 2 second hold-and-release initiates scanning. The scanner is time-operated rather than carrier operated. A continuously active repeater will thus lock a frequency 5 or 6 seconds before scan continues. Assuming the scanning rig stops on a frequency or repeater of interest, a single tap on the mike's push-to-talk switch will cancel the scan mode (without transmitting at that time). A second squeeze of the push-to-talk activates the FT-230R's 25 watt transmitter. If it is desired to enter the operating frequency in memory, a simple flip of the memory selector knob and a tap of the "M" button will store the receive frequency (a separate front-panel switch selects −600, simplex, or +600 kHz transmitter offset, and 2 memories are provided for "oddball splits"). An internal lithium cell with an estimated lifespan of 5 years is then used for retaining memories and v.f.o. information when the FT-230R is removed from its d.c. power source.

First-glance impressions of the FT-230R reminded me of the FT-290R handheld portable, with a full-size meter, larger speaker, and 25 watt final replacing an internal battery pack. This vision was probably due to the FT-230R's smooth-fitting case, "solid" knob feel, and 150 × 50 × 174 mm (width, height, depth) dimensions. Operation of the tiny rig, however, gave the decided impression of a larger unit. The LCD frequency readout and S/output meter are clearly visible in direct sunlight, and they are also illuminated by a small (clear white) lamp for nighttime use. Five digits are presented in the frequency readout, along with memory or priority channel symbols (example: mP6.760.0). Although our particular unit carried only a conventional scanning microphone, we understand Yaesu will soon be including their YM50 touch-tone® mike as a "standard item" with each FT-230R. That would seem to be the final touch to this attractive "bells and whistles" 2 meter f.m. rig.

A Closer Look

On the technical side, the FT-230R features a double-conversion receiver of relatively conventional and proven design. I.f.'s are 10.7 MHz and 455 kHz, with extensive use of FET's in the front end. Overall sensitivity is .25 uV for 12 dB SINAD or 1 uV for 30 dB S/N, a quite sufficient figure for both local and long-distance communications.

The transmitter is straightforward in design, with a single r.f. power module providing a nominal 25 watts output (our unit puts out 27 watts). Relay switching is used for antenna T/R transfer. U.S. models of the FT-230R do not include a high/low power switch; thus, full r.f. output is always used.

The FT-230R seems especially adapted to tone-controlled setups. In addition to a rear-panel-enabled tone burst of 1800 Hz at the beginning of each transmission, a separate front-panel **T Call** but-

*Route 11, Box 499, #1201 South, Birmingham, AL 35210

Say You Saw It In CQ

ton will key the transmitter and send an 1800 Hz tone whenever depressed. Another front-panel button is used for activating the optional FTS-32E subaudible encoder or FTS-32 encoder/decoder combo. The latter item could permit continuous "quiet" monitoring of a busy repeater until a specific "paging" tone was received. Until "toned," the only indication of a yak-infested repeater would be a dim "busy" LED.

A universal-type mounting bracket, plus a 10 foot d.c. power cable (with rig connector), a cigarette-lighter plug, tilt-up bail, microphone, and external speaker plug (⅛ inch barrel type) are included with the FT-230R. Add an efficient antenna, and you're on the air in style. Any 13 volt d.c. power supply capable of providing at least 6 amperes (such as Yaesu's mating FP-12) can be used with the FT-230R. When wiring cables, however, remember to watch polarity. **Kenwood and Yaesu rigs use the same 2-pin connectors, but their positive/negative terminals are reversed!**

Operation

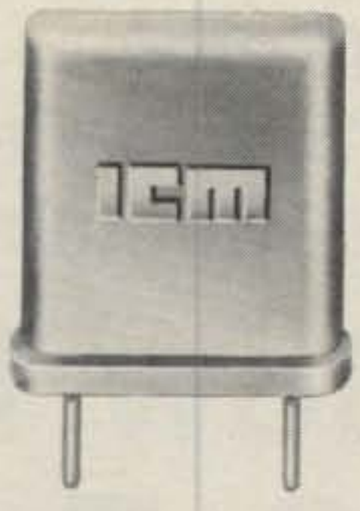
On-the-air use of the FT-230R is quite enjoyable, especially after memories have been programmed and their lithium battery backup enabled. As previously mentioned, we use one v.f.o. for scanning and one v.f.o. for operating. Favorite frequencies are stored in memories for unattended scanning during drive time. I personally enjoy the priority channel capability, as it permits monitoring for calls from the XYL (WB4OEE) while rapping with others via a local repeater. Whenever a "priority" call is received, the rig locks on the "direct" frequency until cleared—a nice feature also when leaving the rig or car briefly.

Transmitted audio reports with the FT-230R have been exceptionally good: crisp and clear, not bassy. Receive audio is good, provided a clear area is available below the rig's bottom-mounted speaker (auto carpets absorb sounds). Since my auto's quad stereo doesn't use a dash speaker, I use a 3 by 5 speaker mounted in-dash above the glove box for amateur operations. That windshield-reflected audio is great.

Conclusion

The FT-230R's small size is especially inspiring for an in-dash auto installation. There's a sturdy and well-insulated shelf on which the auto's stereo sits, and an extra dash "middle area" can be cut/fitted to the FT-230R front, while the rig's rear sits on the shelf previously holding the a.m./f.m. stereo. Why settle for stereo when you can have 2 meters, right?

Whichever way you go—fixed or mobile—the Yaesu FT-230R is a smooth performing and compact unit worth considering. It is quiet sophistication in an attractive package. For more information, contact Yaesu Electronics Corp., P.O. Box 49, Paramount, California 90723.



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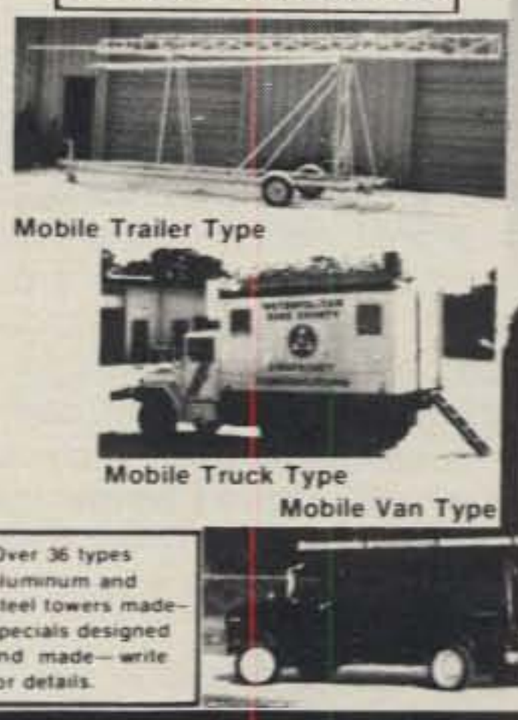

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Here's a simple project that will save your HT batteries for when they're really needed. Operate from the home QTH or mobile with this d.c. to d.c. converter.

How To Construct A D.C. To D.C. Converter For Your HT

BY F.T. MARCELLINO*, W3BYM

"Thanks OM. Sorry about the short QSO, but my batteries are very low, 73." How many times have you heard similar words uttered from a rapidly fading mobile amateur? Or perhaps you have been in the same predicament while using your battery-powered HT in mobile service.

I've experienced this problem, resulting in several shortened QSO's. After analyzing the situation, two solutions to the problem have surfaced. First, I could greatly reduce my transmitter on time—in other words, talk less—or I could design and build a d.c.-to-d.c. converter, thus eliminating the NiCad problem altogether.

Well, it's obvious that I chose the latter of the two solutions, because a mild case of self-induced lock jaw is not my style, as evidenced by this article.

Described herein is a d.c.-to-d.c. converter I built for my Kenwood TR-2500. The unit replaces the stock NiCad battery pack by sliding onto the bottom of the HT. The converter's electrical specifications were tailored for compatibility with the transceiver. Kenwood specs the supply voltage at 8.4 v.d.c. plus or minus 25%, which means this voltage can vary between 6.2 and 10.6 v.d.c. Under these voltage conditions the converter must be capable of supplying 30 ma during receive, 400 ma during **Lo** transmit, or 800 ma during **Hi** transmit. By design, the converter's output voltage is 8.6 v.d.c., thus satisfying Kenwood's ratings, and the HT is happy and not overstressed. I strongly suggest that serious consideration be given to the manufacturer's published ratings. If these voltage ratings are increased, as some amateurs tend to do, risk of long-term component damage due to electrical overstress increases.

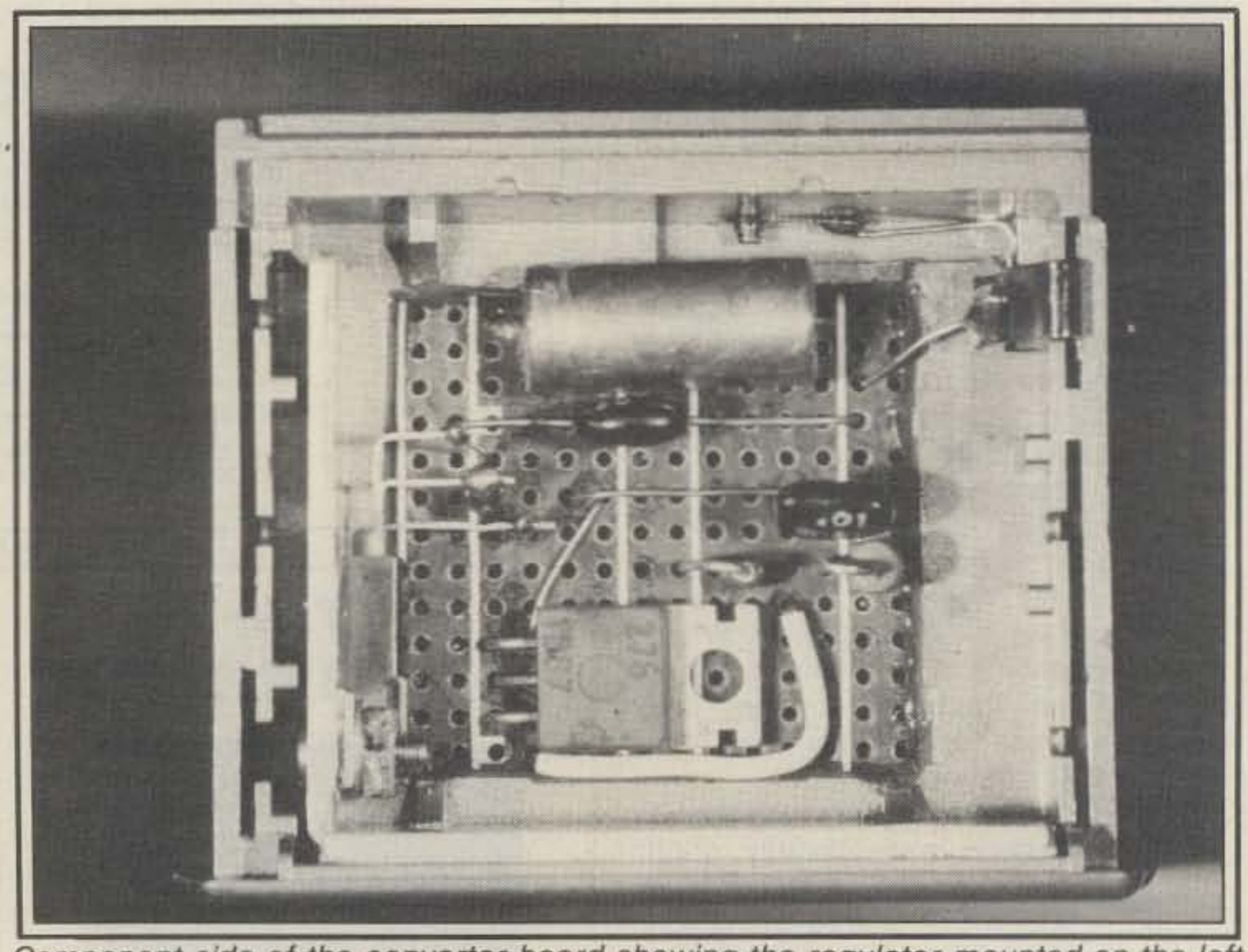
If you have read this far into the article and haven't given up by returning to the index, you are probably primed and ready for more details.

The circuit as shown in fig. 1 is both straightforward and not complex. After all, how many ways exist to design a protected voltage regulator? The heart of my unit is the Motorola MC7808CT regulator chip. This three-terminal device has an output voltage of 8.0 v.d.c. and can deliver in excess of 1 ampere of current. I've adjusted this output voltage to 8.6 v.d.c. by the addition of diode CR1.

CR2, CR3, C3, and R1 comprise the overvoltage protection circuit. The SCR requires no heatsinking, because while in standby it dissipates no power, and during operation it will dissipate very little power. Selection of a 10 volt Zener sets the protection trip level to 10.6 v.d.c. The fuse mounted in the cigar-lighter plug plays an essential part in the protection circuit.

There are two ways in which this circuitry will operate and prevent excessive voltage from damaging the transceiver. Assume 14.5 v.d.c. is present at the input plug, which is normal for automotive operation. Next, for some unexplained reason the MC7808 decides to short internally from input to output. The voltage on output pin No. 2 cannot increase above 10.6 v.d.c. because the Zener diode will begin conducting at 10.0 v.d.c., thus developing the gate firing voltage across R1. The SCR will then fire, which means its anode potential will drop from 10.6 to 0.6 v.d.c. almost instantaneously. At this time the output side of the fuse is near ground potential, and a high inrush of current is able to flow through the fuse-regulator . . . SCR path to ground. Bingo—the fuse opens and the millisecond drama has come to an abrupt end.

The protection circuit also guards against a regulator malfunction that may produce uncontrolled output voltage levels, in which case the fuse may or may



Component side of the converter board showing the regulator mounted on the left heatsink upright.

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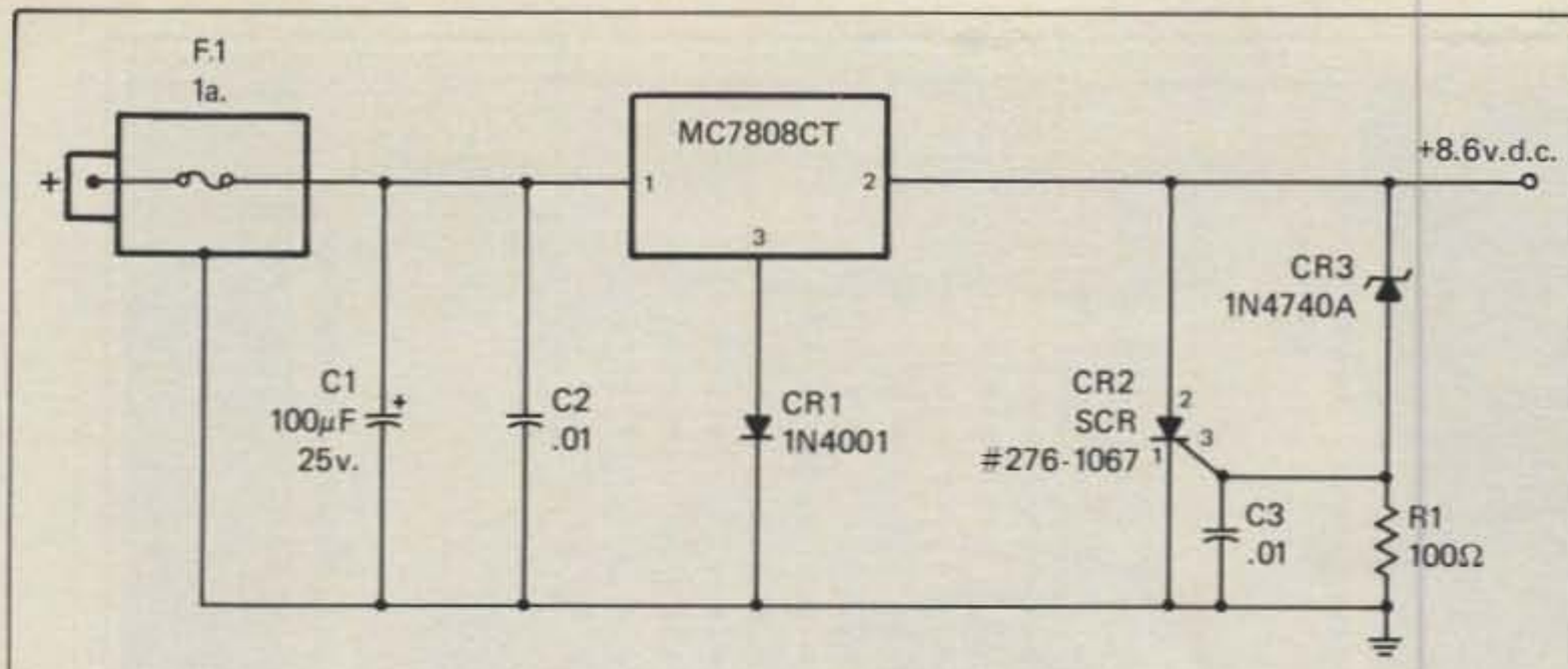

Fig. 1– Schematic diagram of the d.c.-to-d.c. converter used with the TR2500 HT.

not blow. For instance, suppose once again for unknown reasons the output voltage starts creeping upward. Once again the instant the output voltage reaches 10.6 v.d.c., the SCR will fire and drop the output line to near ground potential. In this situation the fuse may or may not blow due to the internal series fault resistance of the regulator, but nevertheless the output will remain low because of the conducting SCR.

Construction starts with the purchase of a Kenwood model BT-1 battery case from your local distributor. The first step is to remove part of the center partition for later insertion of the PC board. I drilled four ¼ inch holes making a square with 1¼" × 1½" dimensions. Using an X-acto™ saw I then cut the thick plastic between the four holes. If you use the outside diameters, you will end up with a fairly square hole. However, if you misjudge, some minor filing may be in order.

Next I removed all but two of the battery clips. These come out easily by pulling with a pair of pliers. Leave both the positive and negative clips because they provide good soldering pads for connecting wires to the PC board.

Cut and mount the PC board into the opening using beads of fast-curing epoxy. Before gluing, file the PC board edges to obtain a good fit into the opening. If you carefully select a similar type and portion of PC board, you will be able to use the three large metal buses to advantage. Looking at the solder side of the board, the metal buses are ground, output, and input, reading from left to right. Placement of the input power coaxial plug can be seen in this same photo. I swapped the stock screws for flat-head 1/72's so the bottom would sit flat in the leather case.

Next mount the regulator to the heatsink using a No. 6 screw and nut, and don't forget to put a smear of thermal grease on the back of the regulator. The grease is a very good method for reducing the thermal interface resistance, allowing the heatsink to pull more heat from the regulator. Under maximum **Hi** transmit load the regulator will be dissipating about 6 watts. That may not seem like very much power, but try to hold your

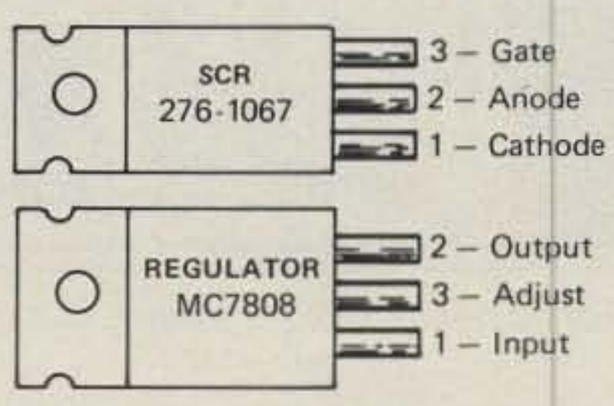

Fig. 2– Top views of the two major active elements.

finger against the regulator. If in doubt, you soon will gain "hands on" experience and appreciation for solid state power dissipation.

Ample room is available within the battery case to mount all components. All

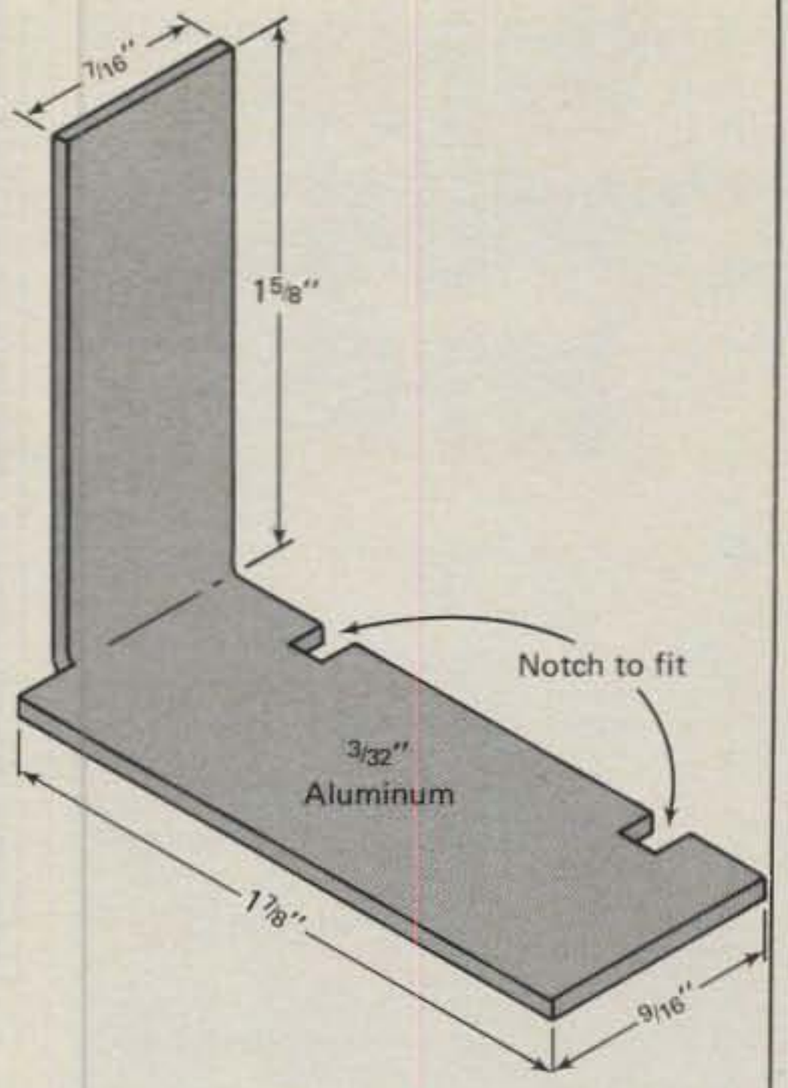

Fig. 3– Heatsink construction details. Mount to bottom of the spare battery case using double-sided tape.

parts are visible in the front view photo except diode CR1. It connects between the center pin of the regulator and the PC board. The diode is obscured by the top solder joint.

After completion of all wiring, the con-

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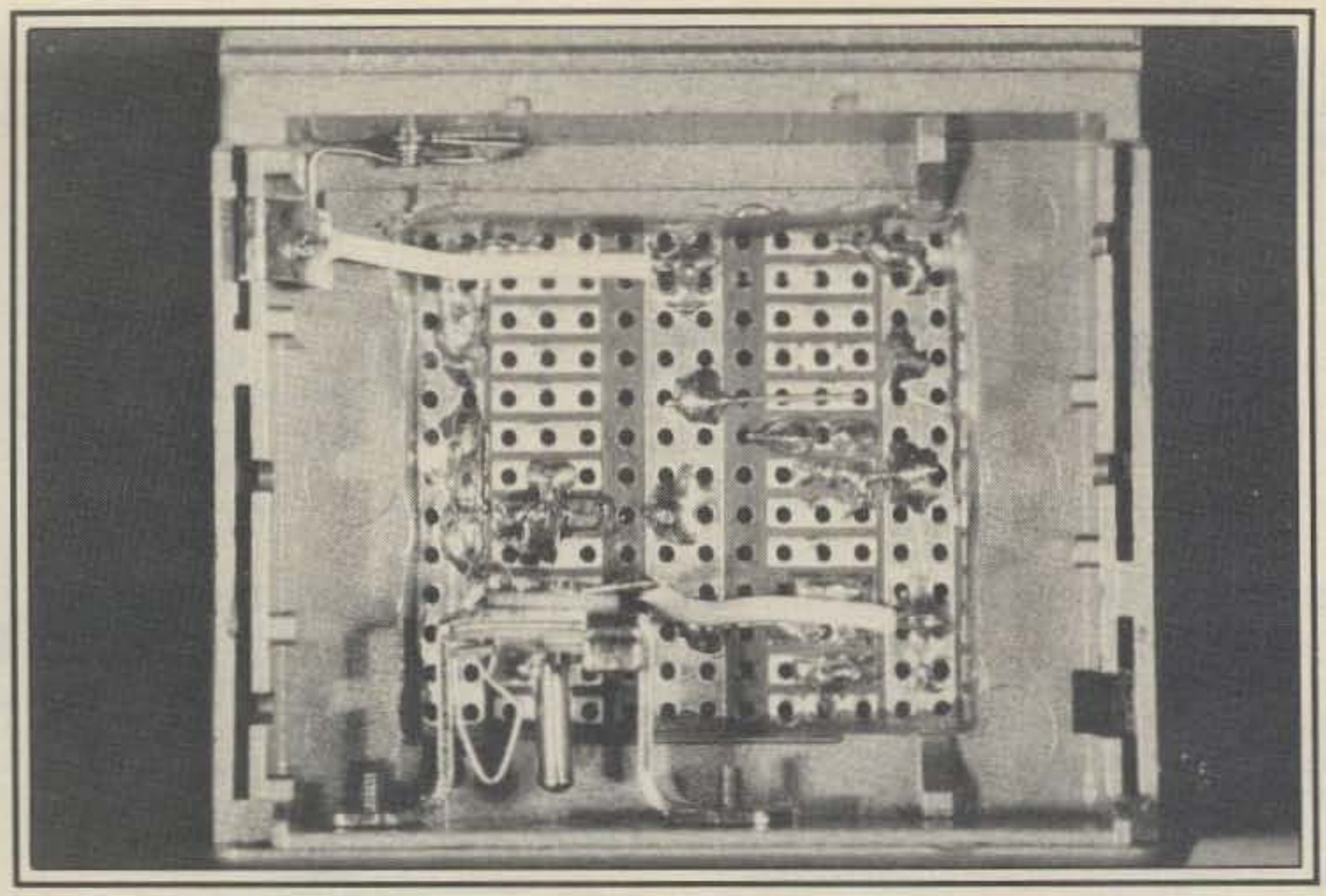
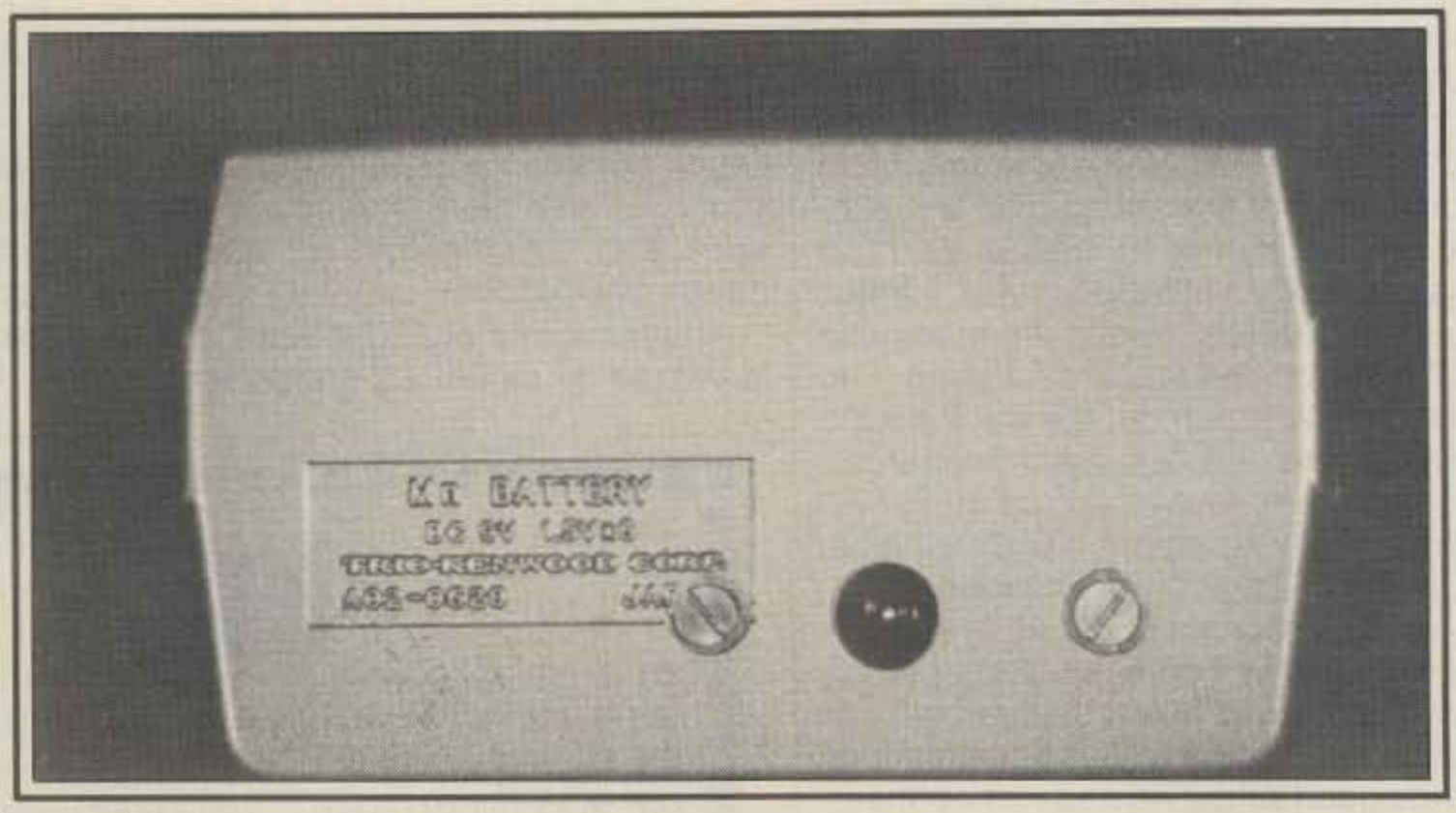


The foil or solder side of the board. The coaxial plug is on the bottom, left of center.



Bottom view of the spare battery case showing placement of the input coaxial plug.

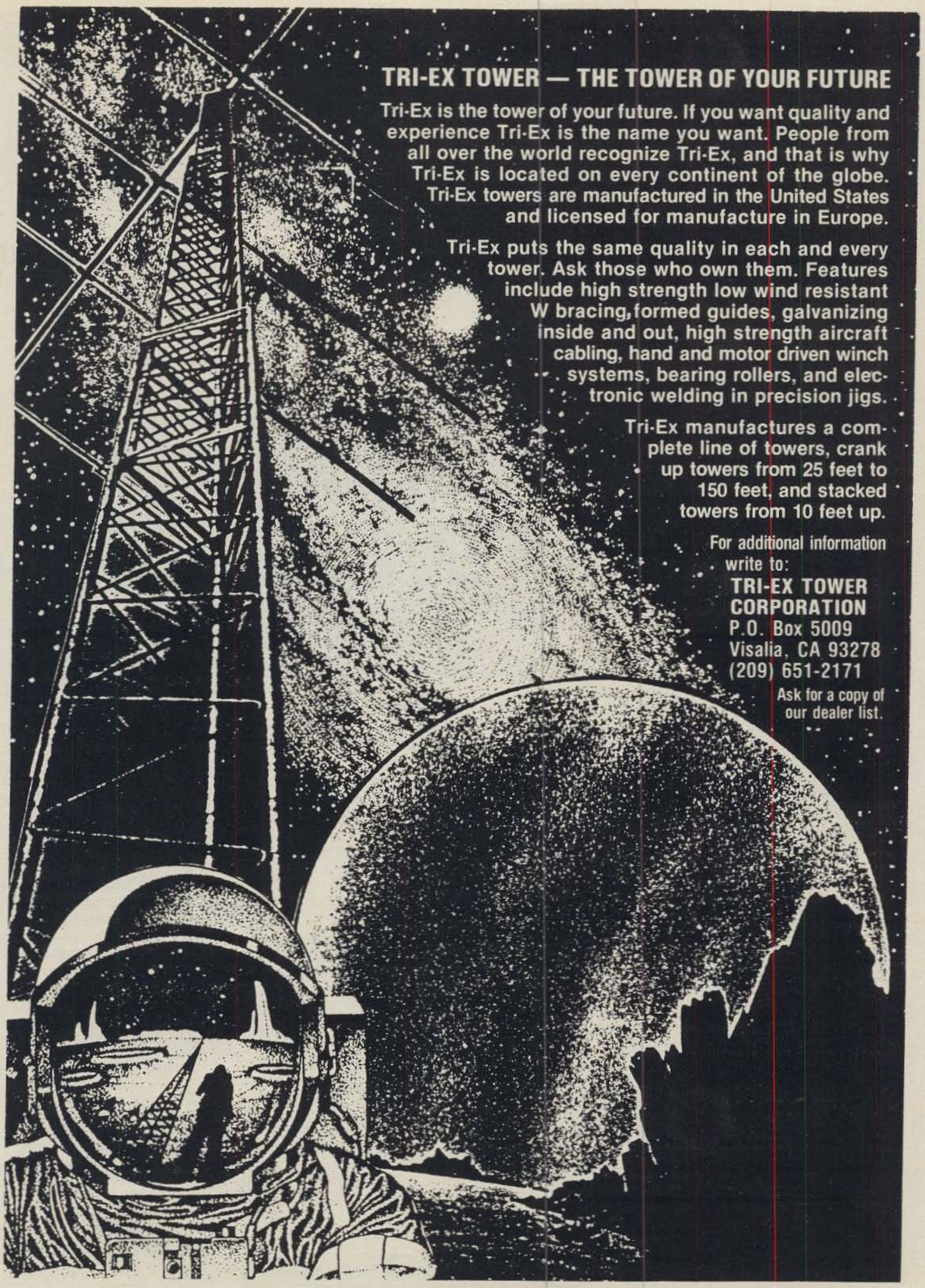
verter can be checked out thoroughly without connecting it to the HT. Connect a variable 12 to 15 v.d.c. power supply to the input plug using a 1 amp fuse in the plug. Connect a 250 ohm resistor across the converter's output terminals and turn on the power supply. If everything is functioning properly, the output voltage should be 8.6 v.d.c. This voltage should remain constant while the input power supply is varied between 12 and 15 v.d.c. During this test the regulator is dissipating less than 200 mw, and any component heating would be abnormal.

If the previous test was successfully completed, connect a 10 ohm, 20 watt resistor in parallel with the 250 ohm resistor. This will simulate an approximate load current change of 30 ma to 800 ma, or the same as going from receive to **Hi** transmit. A 1 amp d.c. current meter may be placed in series with the load resistors to monitor the currents during these tests. If the circuitry is working properly, the output voltage will drop about 50 mV between the two load conditions. During **Hi** power transmitting the heatsink will get warm; again this indicates a normal condition.

The two tests which I've just explained are commonly called *line* and *load* regulation. Variations in the output voltage may not be visible using analog-type voltmeters.

The completed unit will directly replace the standard NiCad battery pack whenever a d.c. source is available. I cut a hole in the bottom of the leather case to accommodate the coaxial power plug. Positioning of the plug on the bottom allows the HT to sit flat on its back with easy access to the keyboard.

This project was fun to design and a challenge to package, plus it saved me the price of a spare battery pack. I hope many of you find my approach interesting and useful with enough information to construct a similar unit.



CIRCLE 29 ON READER SERVICE CARD

CQ REVIEWS:

BY JOHN J. SCHULTZ*, W4FA

AEA's Model MBA-RC

Morse-Baudot-ASCII Reader/Code Converter

Looking at the technical specifications for Advanced Electronic Applications Model MBA-RC Reader/Converter and then at the physical unit itself, one surely has to stand back in awe and regard it as a sort of "Zauberkasten" (magic box). The unit will decode Morse, Baudot, and ASCII incoming signals and display the decoded characters. Then it will encode practically any input for Morse, Baudot, or ASCII transmission. All of this capability is incorporated in a single integrated package that measures an amazingly small 9¼" × 5" × 7¼" and that can be operated from a 12 v.d.c. power source (11 to 15 volts at 1 ampere).

The MBA-RC can be casually looked at as a "transceive" version of AEA's Model MBA-RO Automatic Code Reader. However, it would be unfair to regard the MBA-RC as a simple variation on the MBA-RO's basic design. The MBA-RC is a far more advanced and sophisticated unit, although it definitely retains the straightforward adjustment simplicity and "fun to operate" appeal of the MBA-RO.

The specifications for the MBA-RC are shown in Table I. Of particular interest are the speed ranges on Morse, Baudot, and ASCII, and the RTTY fixed and variable shift ranges on receive. As can be seen, they cover a very wide range that should satisfy practically any application. There are a variety of input/output options, but the flexibility built into the unit should not cloud the fact that the unit is basically self-contained, since it includes input signal processing, code reader, converter and encoder, character display, AFSK tone generator, c.w. sidetone monitor, I.D. memory message, etc.

The rather simple front panel of the MBA-RC belies its versatility with regard to cross-mode operation at a great variety of transmission/reception speeds.

For instance, fig. 1, which shows the external connections possible to the MBA-RC, looks rather impressive. But for basic Morse and RTTY operation, one only needs to make the straightforward wire connections shown from a receiver's audio output and to a transmitter microphone input, c.w. key input, and transmit receive switch, plus a connection to a keyer. With those simple connections here are a few operational possibilities:

1. Straight C.W. operation. The MBA-RC controls have to be set up for c.w. (simply done), and then c.w. stations are tuned in using an LED bar-graph display for maxi-

*c/o CQ Magazine

Technical Specifications

Morse Speed Range	2 to 80+ w.p.m.	AFSK Output	Tone Out Connector
Baudot Speed Range	60, 67, 75, 100 w.p.m.	AFSK Shift	170 and 850 Hz, Front-Panel Variable 100 to 1000 Hz Shift
ASCII Speed Range	110 Baud (300 Baud transmit only)		
I.D. Buffer Capacity	40 Characters	AFSK Output	Rear-Panel Adjustable
Buffer Capacity	1024 Characters	Speaker-Level Control	Rear-Panel Adjustable
TTY Current Loop	20 to 60 ma	Printer Lock-up	For Transmit and Receive
Parallel ASCII Port	26 Pin Socket	Down Shift On Space	For Transmit and Receive
RS 232 Provision (optional)	VIA Current Loop Connector	Audio Input	Rear-Panel Connector
Tuning LED Bar-Graph Indicator	Scope Output (X-Y)	Speaker Output or Tape Input of Audio	Rear-Panel Connector
Keying Output	Cathode, Blocked Grid, and Transistor	Power Required	13 v.d.c. ± 3 v. @ 1.2 amps
Switching	Manual Transmit/Receive or from Automatic Transmit/Receive Contact Closure	Weight	4 lb. 6 oz.
		Dimensions	7¼" deep × 9¼" wide × 5" high
		Scope Output	2.5 to 6.0 volts PP

Table I– Technical specifications for the MBA-RC.

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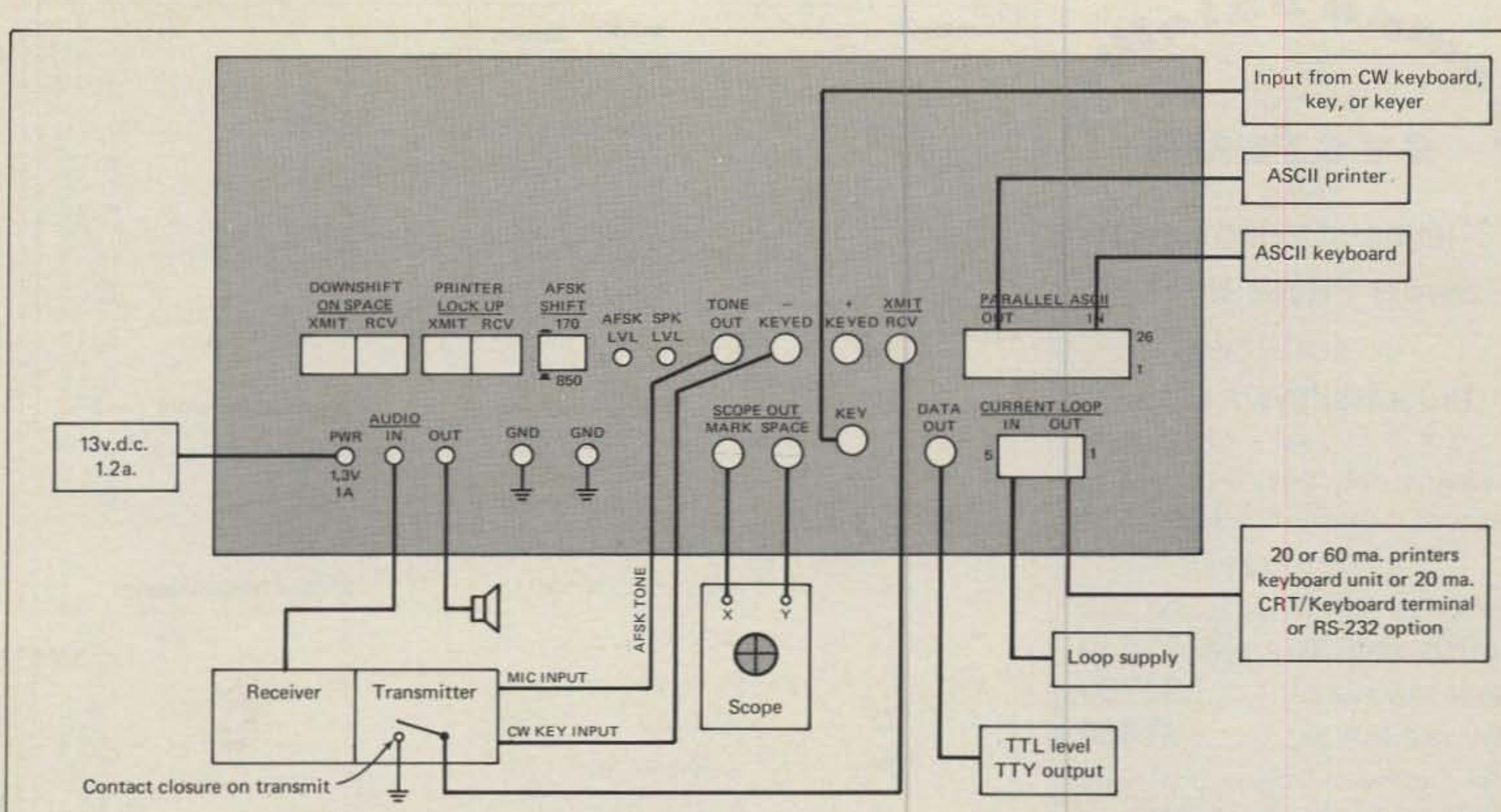
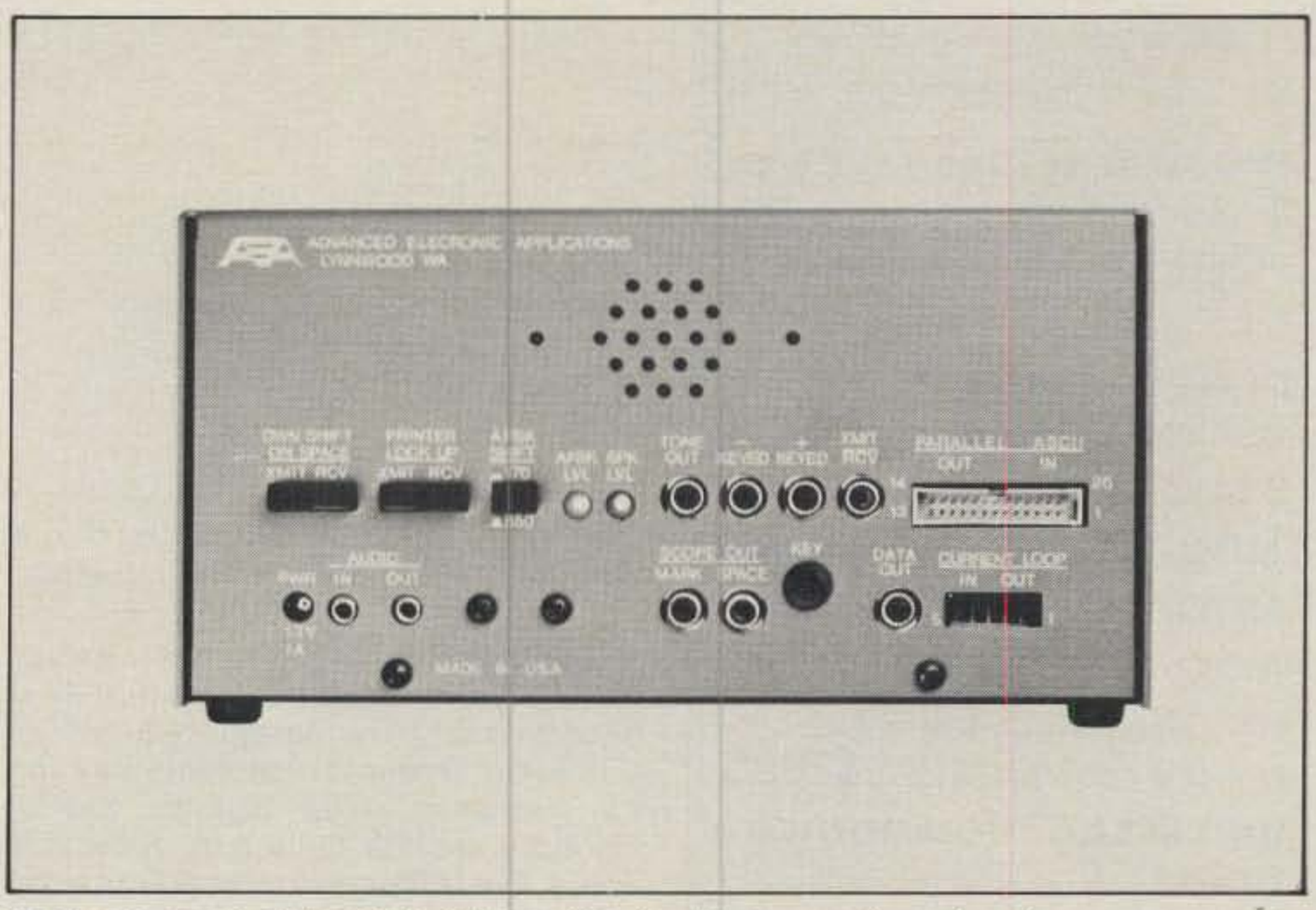


Fig. 1– An illustration of all the possible external connections to the MBA-RC.

mum closure. The display is sort of the modern equivalent of the old "magic-eye" tube. Fine adjustments can be made either using the receiver's tuning controls or the fine-tuning control on the MBA-RC. Once the unit is tuned, and if the transmitting station is sending good c.w., the MBA-RC's 32-character display will show the decoded c.w. characters, and the display will progress from right to left across the panel. Speed tracking is automatic over about the 2–80 w.p.m. range.

The blue fluorescent display is about ⅓ inch high and very easy on the eyes. It takes some time to tune in c.w. stations, but it can be done even under bad QRM conditions after some practice. The main problem, however, is that many c.w. stations do not send good c.w. The MBA-RC is a computer-type device and the old adage about in/out quality applies. As AEA notes, the main value of the c.w. display is probably to help one learn c.w. at higher speeds than one would normally use since it "pieces together" what one would not normally be able to copy completely.

On c.w. transmit, one can visually monitor the transmission on the display. This feature can be either fortunate or unfortunate, depending upon one's fortitude. Remember the computer in/out adage. More than one MBA-RC user has discovered that his keying leaves a lot to be desired particularly with regard to proper spacing between words and letters. If a hand key or electronic keyer is used, the MBA-RC can be set up to perform a speed conversion function. The MBA-RC, if not programmed for higher or lower output speeds, will output c.w. at 20 w.p.m. Changing the output speed is fairly simple. Two digits have to be entered by key or paddle after performing some simple switch manipulations. By further switching, one can have the display numerically show the actual Morse speeds being processed on both receive and transmit. A slight sacrifice in display capability is necessary when this is done, as the display reduces to 28 characters to provide two spaces and two characters for the speed display.



The back panel of the MBA-RC provides for the connection of various accessory devices and contains some switch functions which are likely to be infrequently changed. The built-in monitor loudspeaker faces to the rear.

2. Mixed C.W./RTTY operation. In this case you are keying Morse into the MBA-RC, but the other station is set up to only receive and send regular RTTY Baudot at 60 w.p.m. By proper switch settings, the MBA-RC will convert the input Morse keying into output at 60 w.p.m. Baudot. An I.D. function allows one to load any 40-character message into a memory (normally it would be a call-sign identification) which then can be recalled for transmission in either the Morse or Baudot modes. The display, on transmit, will show the outgoing transmission. A rear-panel switch allows for setting a 170 or 850 Hz output shift and would normally be set to 170 Hz for amateur-band operation.

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Symbols

A	A	1	1	Ä	Ä
B	B	2	2	Å	Å
C	C	3	3	É	É
D	D	4	4	CH	CH
E	E	5	5	Ñ	Ñ
F	F	6	6	Ö	Ö
G	G	7	7	Ü	Ü
H	H	8	8	Non Valid Characters	*
I	I	9	9	Error	BLANK
J	J	Period	.	Understood	&
K	K	Question Mark	?		
L	L	Colon	:	**Additional Teletype Characters**	
M	M	Semi-colon	;		
N	N	Parenthesis	( )	Bell	
O	O	Apostrophe	'	CR	
P	P	Exclamation Point	!	LF	
Q	Q	Quote	"	#	
R	R	Fraction Bar	/	$	
S	S	AS	AS	%	
T	T	SK	SK	&	
U	U	BK	BK	'	
V	V	KN	KN	+	
W	W	AR	AR	Null Character	
X	X	Double Dash	=	[or	
Y	Y	Hyphen	-	] or	
Z	Z	Zero	Ø	Del	

Table II– Symbols as they appear on the MBA-RC display.

On receive, the MBA-RC has to be set up to receive regular 60 w.p.m. RTTY Baudot code. The tuning required is somewhat similar to that necessary for c.w. reception except that one has to manually set the 60 w.p.m. reception speed. The LED bar graph works in a similar manner as on c.w. in that it is tuned for maximum closure; however, two closures are possible, and one has to select the one which produces a steady, non-flickering display. A front-panel switch on the MBA-RC can be set for either 170 Hz shift receive or a variable shift on receive so one can tune in stations that are using odd shifts, either by mistake or on purpose, from 100 to 1000 Hz.

RTTY characters are clearly displayed on the "billboard" panel once proper tuning has been achieved. The MBA-RC will display the full range of symbols commonly used in RTTY plus a few unusual ones as shown in Table II.

3. Mixed C.W./ASCII operation. Here you are keying Morse into the MBA-RC but the other station is set up to transceive only on 110 Baud ASCII. Admittedly, this sort of situation doesn't happen too often, but by proper control manipulation the MBA-RC will easily handle it. It will convert the input Morse into 110 Baud ASCII AFSK output on transmit and read the received 110 Baud ASCII on the 32-character display. The good length of the display, by the way, makes reading text on it a practical reality even at the 110 Baud rate.

For casual Morse or RTTY transceive operation and for general-purpose RTTY reception on shortwave (e.g., monitoring news and weather services), the simple setup just described will probably suffice for a time period. However, it probably will not take too long for most operators to feel the need for some auxiliary equipment. Fortunately, the MBA-RC can act as the focal and control point for a great deal of accessory equipment, and whatever setup one eventually develops will

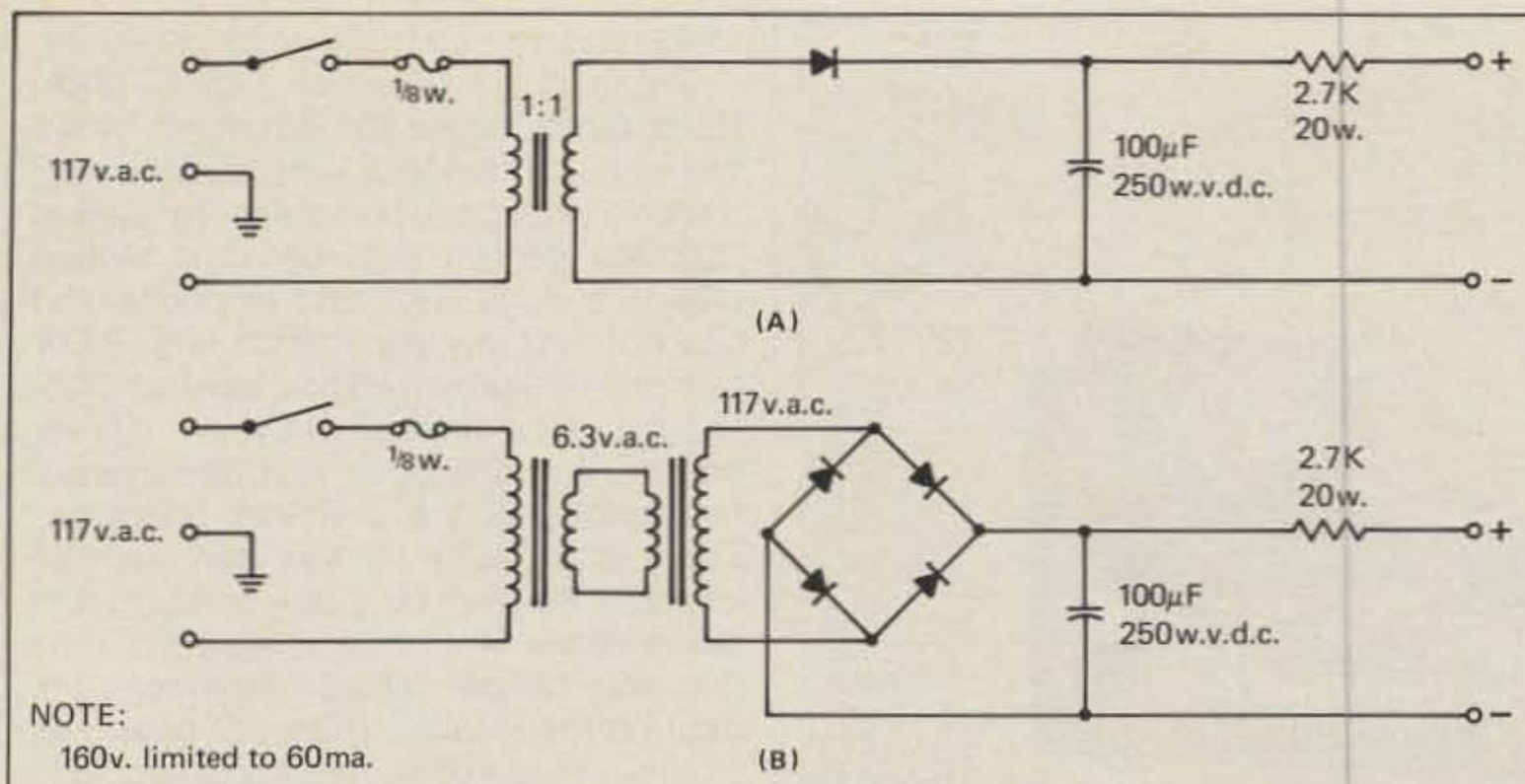

Fig. 2– Two simple 60 ma loop supplies that one can use with mechanical printer keyboards.

probably depend on the combination of one's interests and the size of one's pocketbook.

For instance, referring back to fig. 1, one could utilize the current loop in/out connection to interface with either an old-fashioned, but not too expensive, mechanical printer keyboard (Model 15, 19, 26, etc.) or to a modern video-display/keyboard combination. A simple loop supply of the type shown in fig. 2 is also required for use with mechanical devices, while an AEA RS-232 interface device may be necessary for use with a video terminal. In any case, this sort of addition really allows the versatility of the MBA-RC to be displayed.

Assume, for instance, that one adds only a simple fixed speed 60 w.p.m. printer keyboard. If one wants to use any of the operational modes previously described, the MBA-RC will drive the printer for hard copy on input Morse, RTTY, or ASCII. However, some of the new possibilities now are:

1. Mixed 60 w.p.m. RTTY/ASCII 110 Baud operation. The MBA-RC will take the 60 w.p.m. input from the keyboard and convert it to 110 Baud AFSK for transmission. On receive, the incoming 110 Baud signal will be converted to 60 w.p.m. to drive the printer.

2. Mixed or same w.p.m. RTTY operation. The MBA-RC will take the 60 w.p.m. keyboard input and output for transmission AFSK at 60, 67, 75, or 100 w.p.m. On receive a 100, 75, 67, or 60 w.p.m. signal will be converted to 60 w.p.m. to drive the printer.

3. Mixed 60 w.p.m. RTTY/Morse operation. In this case if one is working a c.w. station, the MBA-RC will accept the 60 w.p.m. keyboard output and convert it to Morse for transmission (the speed being set by a keyboard command). The received Morse will be displayed on the 32-character display and also converted to drive the 60 w.p.m. printer.

If one adds more sophisticated input/output equipment (e.g., electronic keyboards with message-storage capability or video equipment with text-storage/recall capability) one can, of course, enjoy all the added features of such devices. If one uses ASCII 110 Baud equipment, most of the speed conversions previously described are possible. For instance, one can use the ASCII 110 Baud equipment and have the MBA-RC make the necessary conversions to communicate with a station using 60, 67, 75, or 100 w.p.m. RTTY or with a station using Morse. If one has a 300 Baud ASCII printer, the MBA-RC will drive it when receiving a station working 110 Baud ASCII, but it will not input 300 Baud. The MBA-RC's ASCII interface is a parallel output that may be used with Centronics, Epson, and other parallel-input ASCII printers; the parallel input is 7-bit ASCII, TTL level, high true with a low true strobe.

The MBA-RC has several convenience features that are useful on RTTY and/or ASCII. Downshift on space can be chosen for Baudot transmission and/or reception. When activated, this feature automatically generates a downshift character when a space character is sent and/or received to reduce possible garble. A printer lock-up feature allows keyboard local loop operation without going through the MBA-RC on receive and prevents operation of a printer, if desired, by the MBA-RC while transmitting. There is a push switch to generate a carriage return/line feed manually, when desired, or one can choose an automatic carriage-return/line-feed feature such that those characters are generated at the first space following 60 characters or at the end of 71 characters total. This mainly is useful to prevent overrun on a station's RTTY printer when one transmits Morse.

Not every operational feature of which the MBA-RC is capable could be tried. But all of those which could be tried worked perfectly. The speed-conversion feature does, of course, necessarily involve a buffering operation. The 1024 character buffer never showed an overflow condi-

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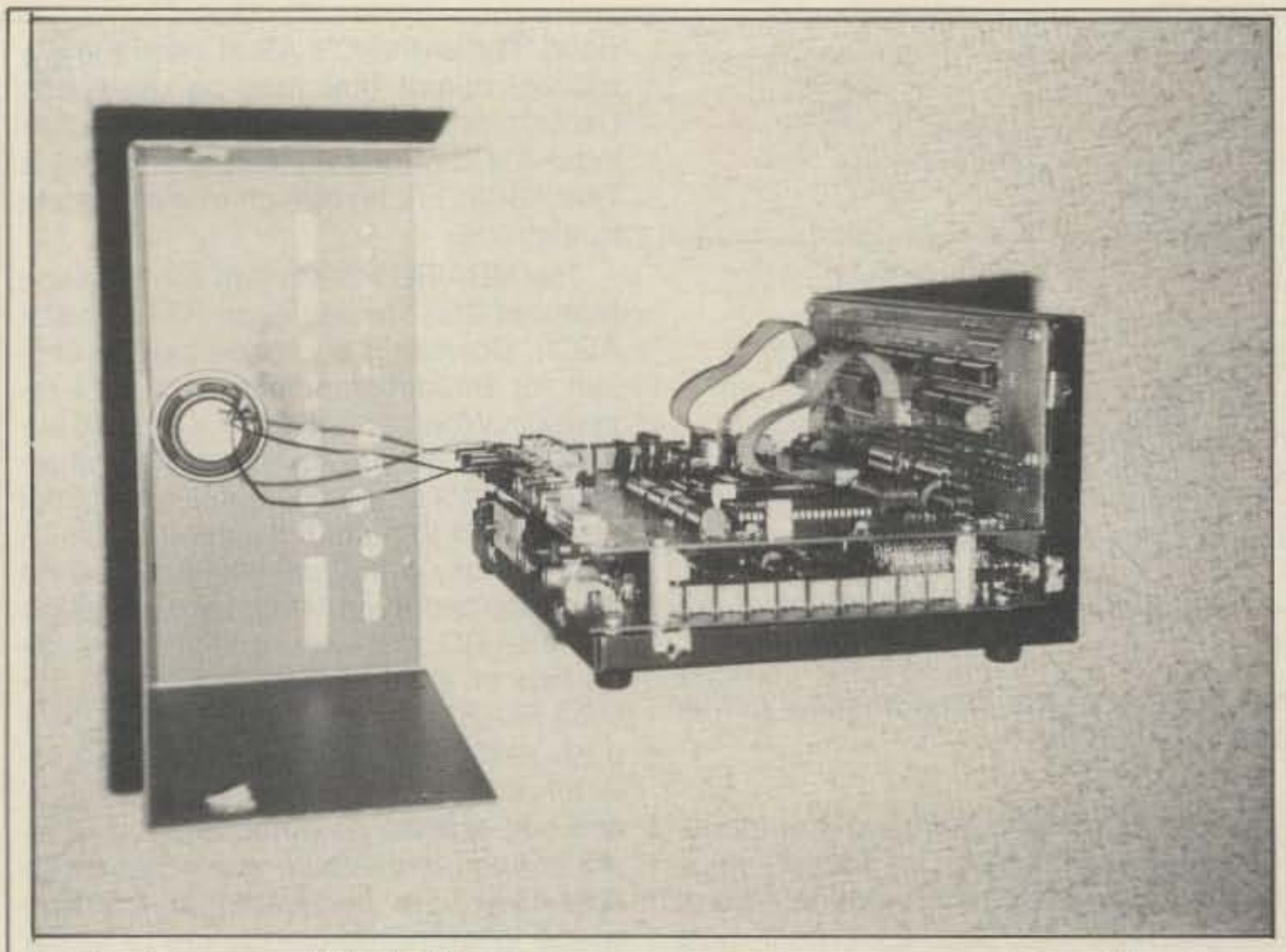

Taking the cover off the MBA-RC, one sees a very neat, commercial-quality arrangement of PC boards.

tion. It will handle almost every transmission-speed conversion one is likely to encounter. For example, about 5 minutes of continuous 110 Baud ASCII can be buffered for conversion to 60 w.p.m. output.

The front-panel controls on the MBA-RC are arranged very well for a unit of such versatility. Basically, below the display there are two sets of slide switches, one each for "input" and "output." The "input" slide switches are set to the speed and/or mode of the input which is to be transmitted and the input which is to be displayed. The "output" switches are similarly set for the output signal to be transmitted and the output signal going to an output device such as a printer. The LED tuning bar graph is a great improvement over trying to watch flickering individual LED's for tuning purposes, although anyone seriously into RTTY will still prefer an oscilloscope display (the MBA-RC has outputs for an oscilloscope X-Y display). The pushbuttons that one is likely to adjust only once (e.g., AFSK output shift of 170 or 850 Hz) are located on the back panel, while switches one is likely to use frequently (e.g., selection of 170 or a variable shift on receive) are located on the front panel. The only fault that could be found with the switches concerned not their placement, but their operation. Several required several pushes before they would lock in their "in" position. That was absolutely the only cosmetic fault that could be found. Various control LED's indicate when the unit is in a receive or transmit status and when the buffer is full.

Taking the cover off the MBA-RC, one sees a steel frame type of construction. There are three main double-sided PC boards which are interconnected by ribbon-type cable with connectors. All of the components are very neatly mounted on the boards. The IC's are all socketed. All of the input/output connectors are bypassed, and there was no detectable r.f. radiation from the computer chips in the unit. In summary, the construction seems to be excellent and of what one could term good commercial quality. The unit should easily be able to handle the normal jolts associated with portable/field usage and provide many years of service.

The manual that comes with the MBA-RC is nicely done. The emphasis in the manual is on setting up and adjustment of the unit, and many pictorials are used to illustrate control settings. It is written clearly enough such that someone who has not had any experience with RTTY terminal equipment should have no problem setting up the unit. However, it is important that one does read the manual before putting the unit into operation. There is probably no way that one can damage the unit by a few false control settings, but one can waste a lot of time that way before seeing clean copy appear on the display. Theory of operation of the unit is not covered and probably would not be helpful, since the heart of the unit is two microprocessors custom-programmed by AEA. Aside from them, there are some 43 IC's and various transistors in the unit. A complete schematic and parts list is presented so basic trouble-shooting can be done, if ever necessary. All necessary connectors are furnished. There is a 90-day warranty, and reports of follow-up factory service and user advice have been very good.

The MBA-RC is undoubtedly an advanced piece of equipment and is just as useful for training as for operational purposes (it will help you to clean up your horrible fist, if necessary). It is truly an interesting and fun piece of equipment that will make c.w. buffs enjoy their mode of operation much more and convert quite a few to RTTY. Considering its tremendous versatility (probably only 50% of which was convered in this article) and quality, it also represents "advanced" value for the money.

The MBA-RC in operation. This temporary setup is hardly an example of neatness. But who could resist putting a unit like the MBA-RC into operation as quickly as possible?

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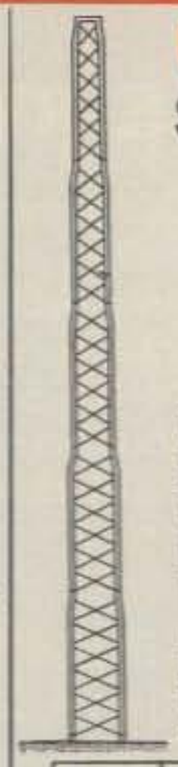

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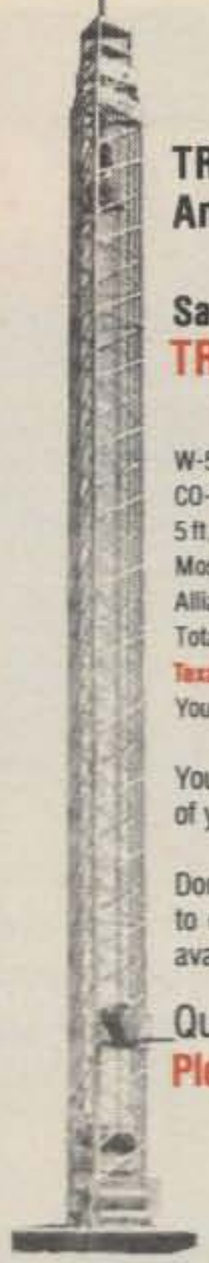

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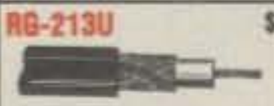

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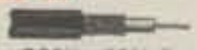

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TH5MK2S Broad Band 5-el Triband Beam	$319
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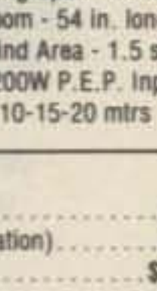

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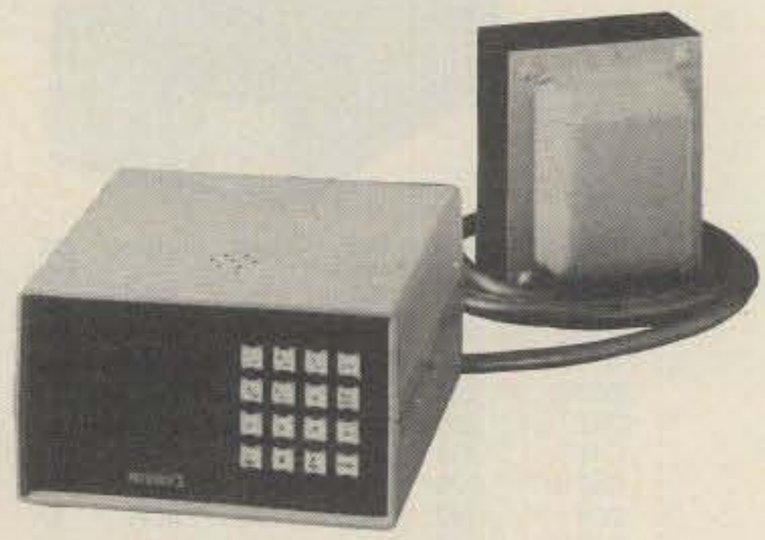

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Here's a good club project that will keep you in good stead for emergency situations. As the Boy Scout's motto says, "Be prepared."

How To Build An Emergency Alert Tone Decoder

BY JAMES R. VALDES*, WA1GPO

A common problem shared by many amateur groups is how to contact everyone when a communications emergency arises. This article describes a circuit which can be interfaced to a monitor receiver for alerting purposes.

**63 Alderberry Lane, E. Falmouth, MA 02536*

Circuit Description

The schematic diagram for the alerting system is shown in fig. 1. This circuit contains the power supply for the receiver as well as the alerting circuitry. The alert function is very simple. It requires that a specific tone be present for a predetermined length of time; when the valid tone is recognized, an output latch is set. The regulated output voltage is determined by zener diode D5. Therefore, to change the output voltage only D5 is changed. The output voltage is found as follows:

$$Vout = VD5 - .6V$$

The a.c. voltage rating of the supply transformer should be a minimum of 2 volts higher than the desired regulated voltage. In operation the alert tone input is connected to the monitor receiver's

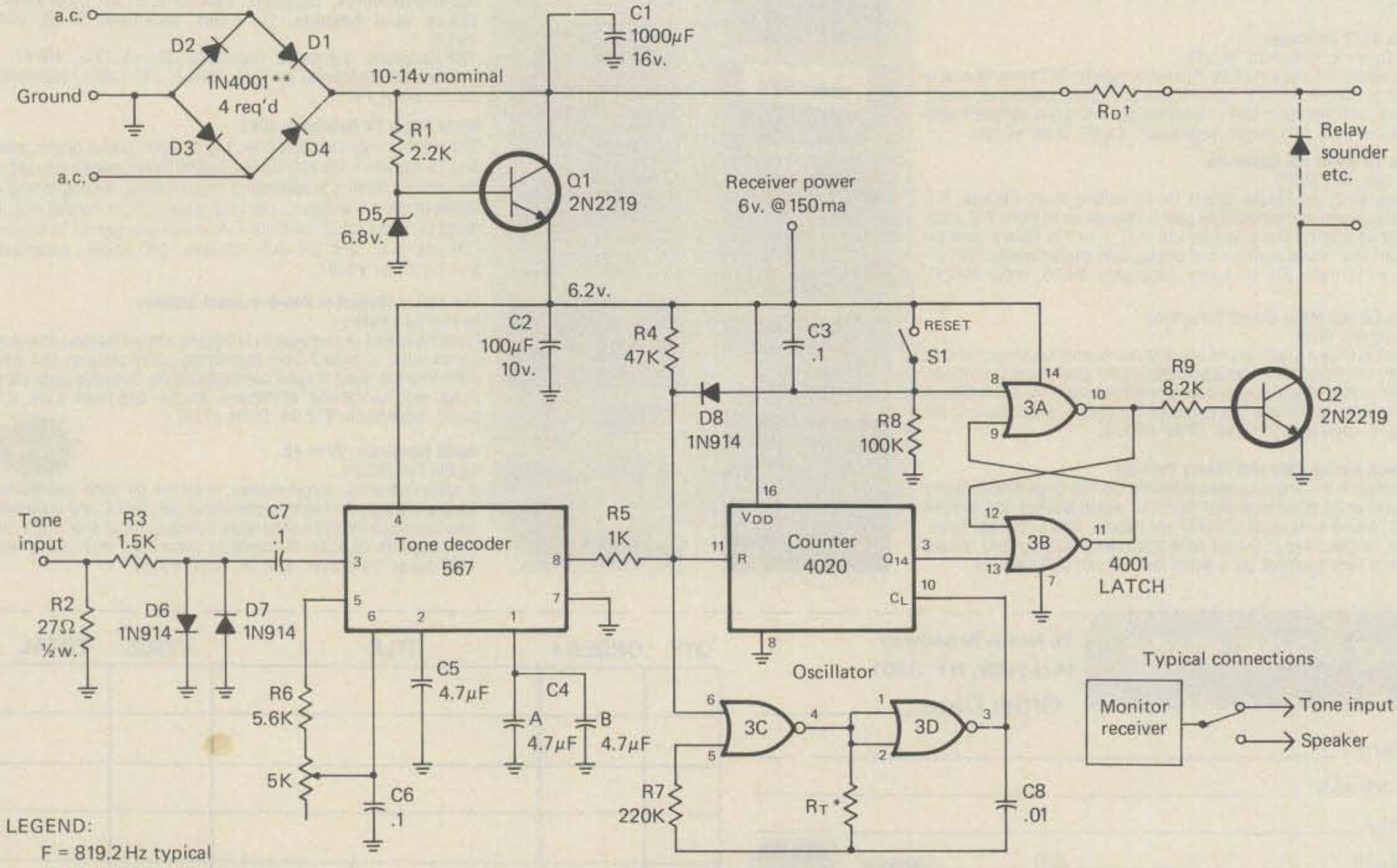
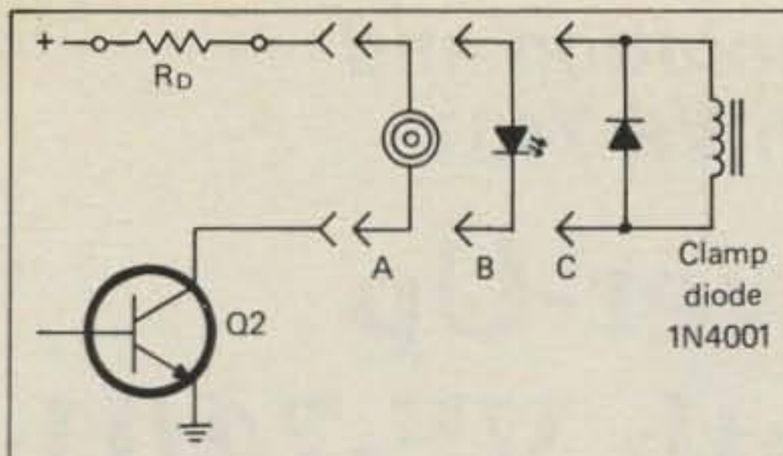


Fig. 1– Schematic diagram of the emergency alert tone decoder.

Say You Saw It In CQ



	TYPICAL R_D	OUTPUT DEVICE
A	Jumper	Sonalert®, buzzer, etc.
B	1.5KΩ	LED
C	Jumper	Relay

Fig. 2– Output indicating devices.

speaker output. The audio input is limited by diodes D6 and D7, and then applied to the tone decoder, IC1. When the proper frequency is detected, the output of the decoder goes low. This pulls the reset line of IC2 and pin 6 of IC3 down, enabling the counter and the oscillator. IC2 is a binary counter used to generate a digital delay. After the selected tone has been detected for a period of time determined by the oscillator frequency, the counter output (pin 3) goes high, setting the latch, and turning on Q2. The oscillator is determined by the value of resistor Rt; a 51K produces a delay of 10 seconds. Knowing the time delay desired, the oscillator frequency can be calculated as follows:

Fosc = 8192 / Time Delay (sec)

In our example, a 10 second delay requires on oscillator frequency of 819 Hz. As previously mentioned, when the latch is set, Q2 is turned on, enabling the output device. The alert device can take many forms as shown in fig. 2. Included in the output line are provisions for a dropping resistor Rd, should current limiting be required. Once activated, the alert requires a manual reset as shown by the switch in fig. 1. C3 and R8 form a power on reset one shot, so the latch is reset when power is applied. Fig. 3 is the full-size circuit-board negative, and fig. 4 is the parts placement diagram. There are several power-supply options available to the builder (see fig. 4):

a) Full-wave bridge—insert diodes D1 through D4;

b) Full-wave—insert D1, D4 with transformer c/t to ground;

c) Half-wave—D1 only.

Note that the maximum current available from the regulated supply is 150 ma.

Tuning Instructions

1) Check the regulated output voltage. With the values shown this voltage should be 6.2 volts.

2) Connect a frequency counter to pin 5 of IC1 and adjust VR1 for the desired frequency to be decoded.

3) Connect the frequency counter to pin 3 of IC3. Ground pin 11 of IC2 and select Rt for the calculated oscillator frequency.

That's it. All that remains is to connect the monitor receiver to the tone input and verify its operation.

General Notes

There are several options one has for a monitor receiver. Several of our local amateurs have obtained the circuit boards from a four-channel pocket scanner and have converted these for use in the monitor/alert system. Since the decoder is simply looking for a tone, a receiver squelch is not required. Weather radios, available from several manufacturers, can be retuned, the speaker disconnected, and the units used as dedicated monitors. Of course, any v.h.f. transceiver or scanner can be used. This alerting scheme has been endorsed by the Falmouth Amateur Radio Association, and I wish to acknowledge their support. My thanks to Bob, W1HWU, for his prototype construction of the original circuit and to Digital Electronics Corporation for their help in obtaining the scanner boards. All comments and inquiries will be acknowledged provided an s.a.s.e. is enclosed. Should there be enough interest, I can arrange to have the boards produced commercially. Start building now so you'll be ready for the next emergency test.

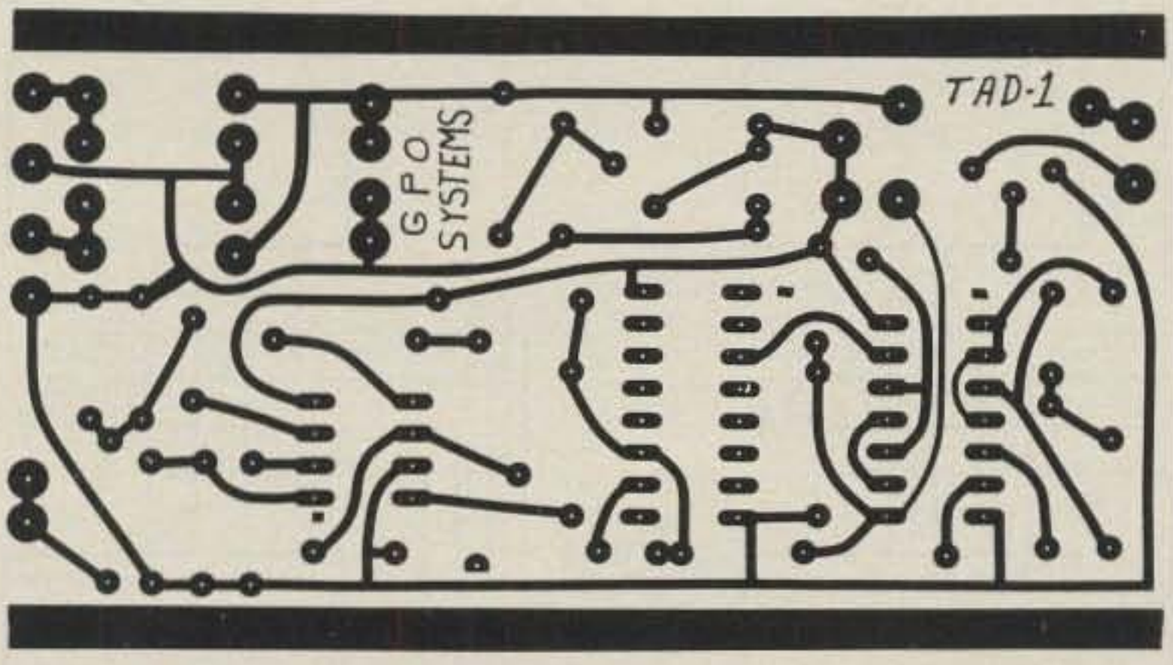


Fig. 3– Full-sized printed circuit board layout.

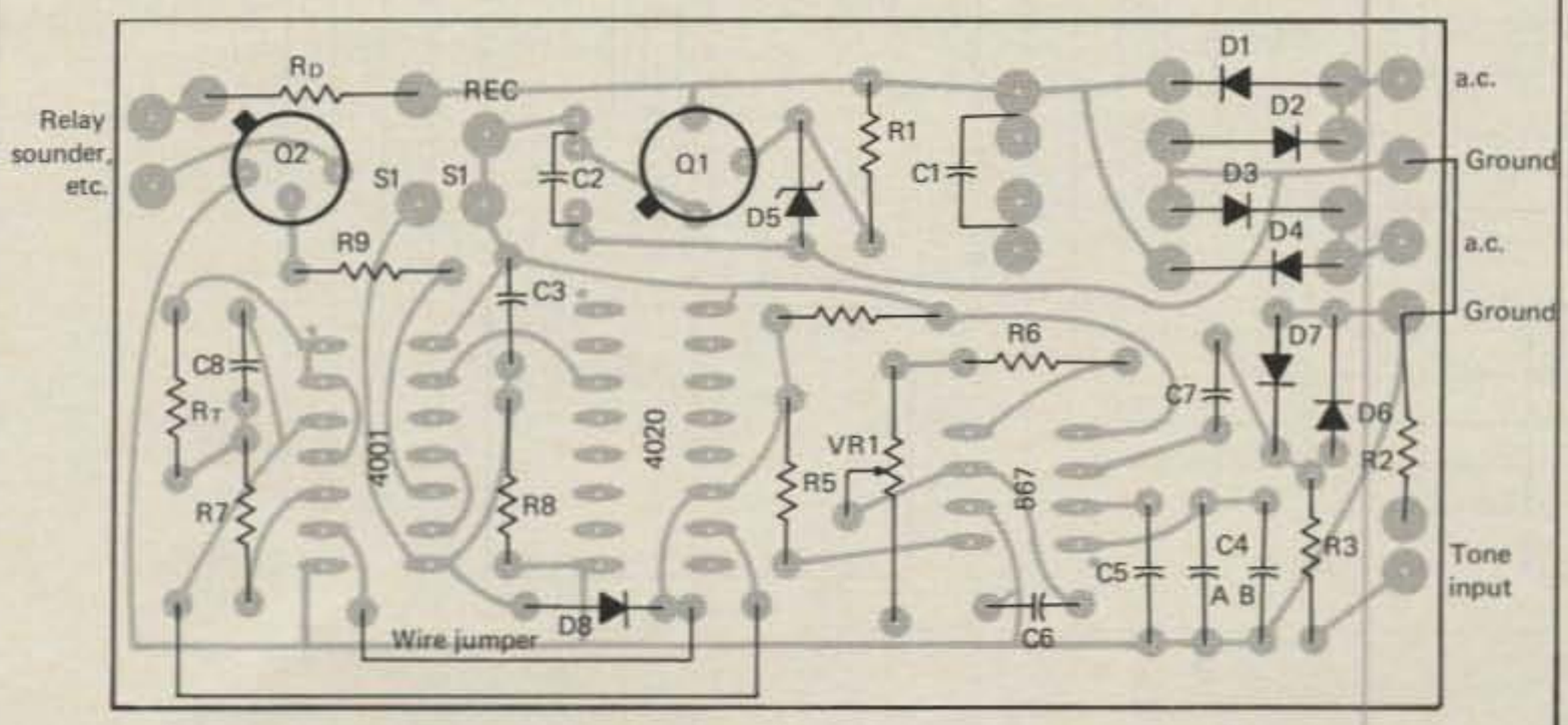


Fig. 4– Component placement view of the printed circuit board.

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196-814	220-225	BNC connector	6.95

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CIRCLE 44 ON READER SERVICE CARD

WD8BHH comes up with an interesting solution and simple modification to improve the Heath VF-7401.

Programmable Power-Up Frequency For The Heath VF-7401 Two Meter Transceiver

BY DENNIS C. FAIT*, WD8BHH

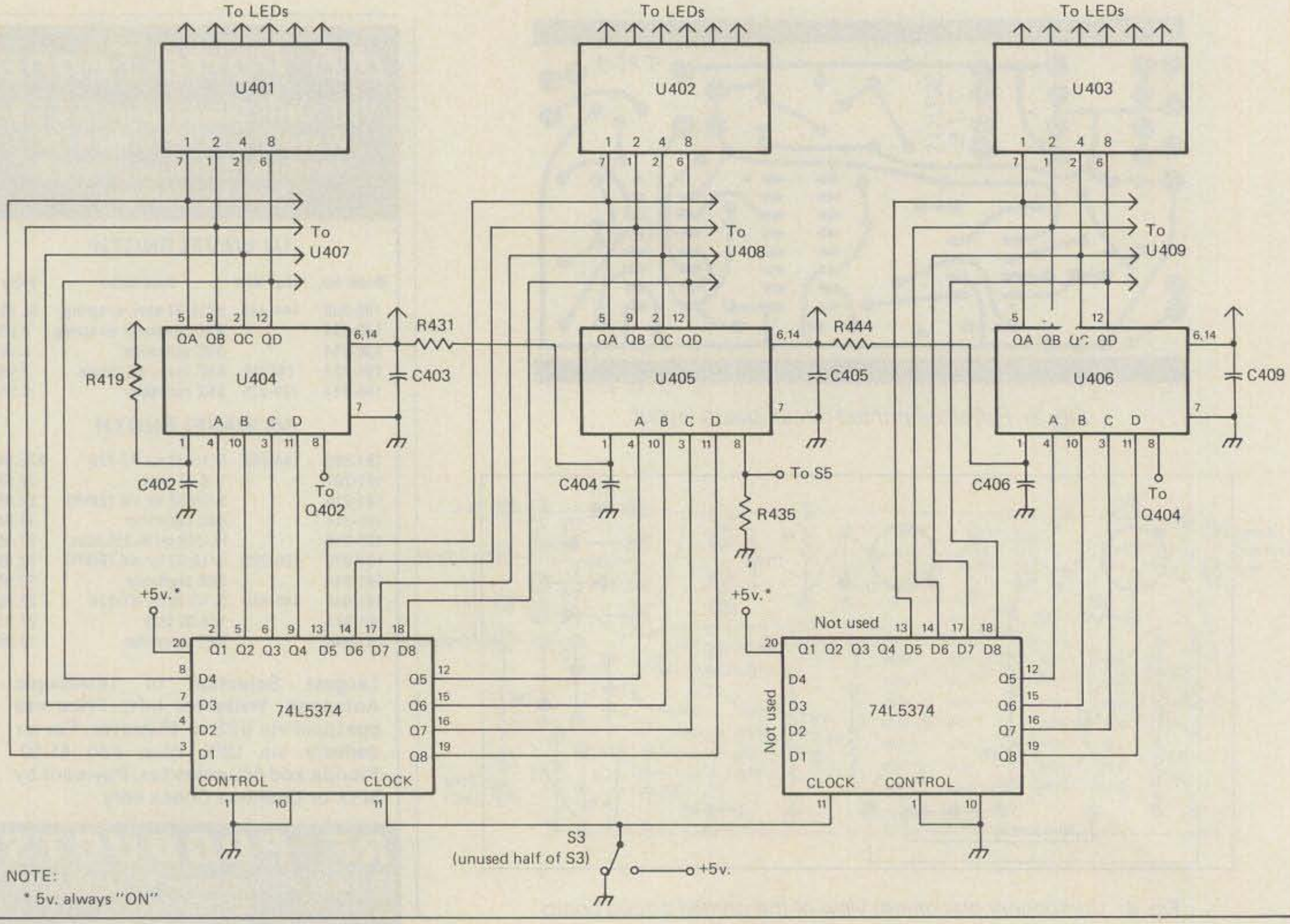
How often have you wanted your Heath VF-7401 2 meter rig to come up on a frequency different from the one you hardwired it for? If your answer is more often than occasionally, this modification may be the one- to two-evening project you've been looking for. Simply put, all you need to do is add two 74LS374 Tri-State flip flops to the VF-7401's synthesizer circuit, "add" a clocking switch and a 5 volt regulator, and disconnect the 12 programming wires you connected when you built the rig.

The 74LS374, which is used as an 8-bit memory in this project, has 8 input and 8 output lines. Data on the input lines are latched and placed onto the output lines when pin 11, the clock input, is strobed high. The output lines are Tri-Stated—a feature not used in this modification—when pin 1 is held high.

To use the 74LS374 as a memory for the VF-7401, all you need to do is run the outputs of two 74LS374's to the inputs of

*P.O. Box 22, Slippery Rock, PA 16057

Fig. 1– Partial circuit of the Heath VF-7401 synthesizer board shows the addition of two 74LS374 ICs (bottom) to replace the original 12 frequency programming wires which set the power-up frequency. Pin 20 of each 74LS374 goes to an unswitched 5 v.d.c. supply, pins 1 and 10 are grounded, and pin 11 goes to SW3 (see fig. 2). The data lines and Q outputs are paralleled with U404, U405, and U406.



Say You Saw It In CQ

U404, U405, and U406 (programmable decade counters) and run their outputs to the inputs of the 74LS374's. Then connect the clock lines of the 74LS374's to an external switch. I found the easiest way to accomplish this was to pull U404–406 and mount them with the two 74LS374's on a small perfboard. Parallel U404–406 with three empty IC sockets and use DIP jumpers from there back to the now-empty sockets on the VF-7401's synthesizer board. While you're doing that, solder the 12 programming wires and snip their ends or otherwise protect them from shorting. These wires will not be used further.

Wire-wrap the two 74LS374's to U404–406 according to fig. 1. Use decoupling capacitors on pins 6 and 14 of U404–406 and pin 20 of each of the 74LS374's, and for the same reason (eliminating noise) keep the length of the DIP jumpers as short as possible. (I placed the perfboard loose on top of the transmitter circuit board in the vicinity of U103–106 and used tape to insulate it from its surroundings. Each jumper is about 6 to 7 inches long.)

Next, locate switch SW3 on the VF-7401, the switch you use to add 5 kHz to the operating frequency. Looking at the front of the rig, this is the top-right silver pushbutton. Inside you'll notice one half of this switch is unused. This is the half you will use to clock the 74LS374's, i.e., program the power-up frequency.

Connect the frontmost pin of the switch (see fig. 2) to +5 v.d.c. and the rearmost pin to ground. Run a line from the center pin to pin 11 of both 74LS374's.

Now when this switch button is released (adding 5 kHz to your signal) and pushed in again, the 74LS374's will be clocked once, thereby latching the displayed frequency. This latched data is present on the outputs and available to U404–406 when you power up the rig. As long as power is not removed from the 74LS374's, the rig may be turned off, the new frequency will be retained in the 74LS374's, and the rig will power up on this frequency the next time you turn on the rig. But, let's do one more thing.

As I alluded to above, the 74LS374's must be powered all the time or they'll forget. The best way to do this is to add a 5 volt regulator to the rig in such a way that is not switched off when you turn off the rig. I mounted mine near the transmitter circuit board on the copper chassis to which the speaker is attached. Tap into the 12 volt source between its entrance into the cabinet and the external on-off switch. The output of this regulator is fed to pin 20 of each of the 74LS374's, guaranteeing they will remained powered when you shut off the rig.

One small disadvantage appears when you remove the 12 volt source from the rig. The 74LS374's will lose their memory. However, when you restore the 12 volts, all you need do is reprogram them by resetting the displayed frequency and pushing the 5 kHz switch on and off.

I made this modification to my VF-7401 some time ago and have had few problems with it. (Mounting the modification as close as possible to the sockets for U404 and U405 will reduce or eliminate any potential problems due to extreme temperature conditions.) It's a joy to be able to walk out of a restaurant or motel in a strange town and power up on the local repeater frequency without resetting the displayed frequency each time. ▣

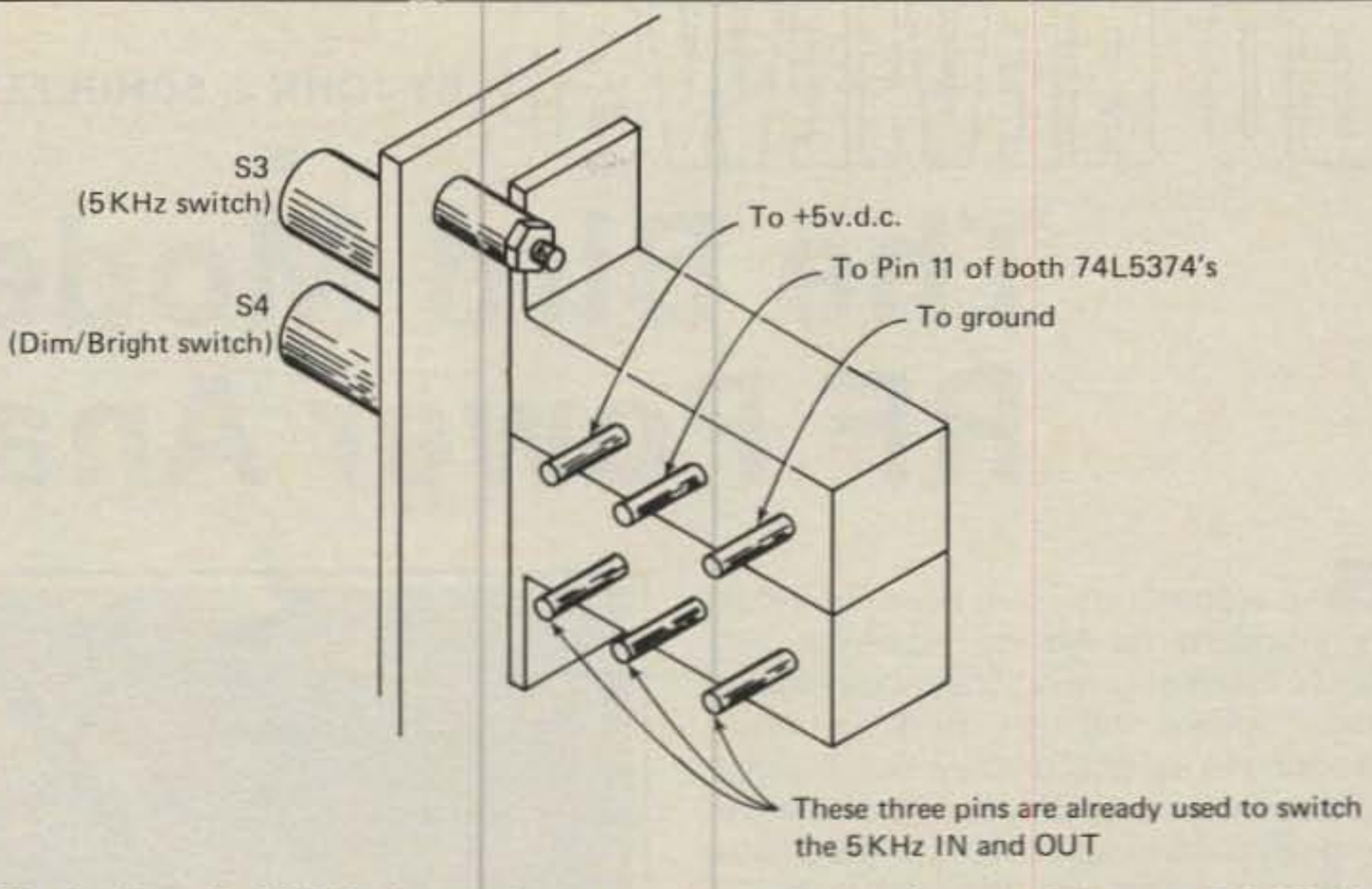


Fig. 2– Detail of SW3 shows where to attach pin 11 of each of the two 74LS374's.

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CIRCLE 143 ON READER SERVICE CARD

CQ REVIEWS:

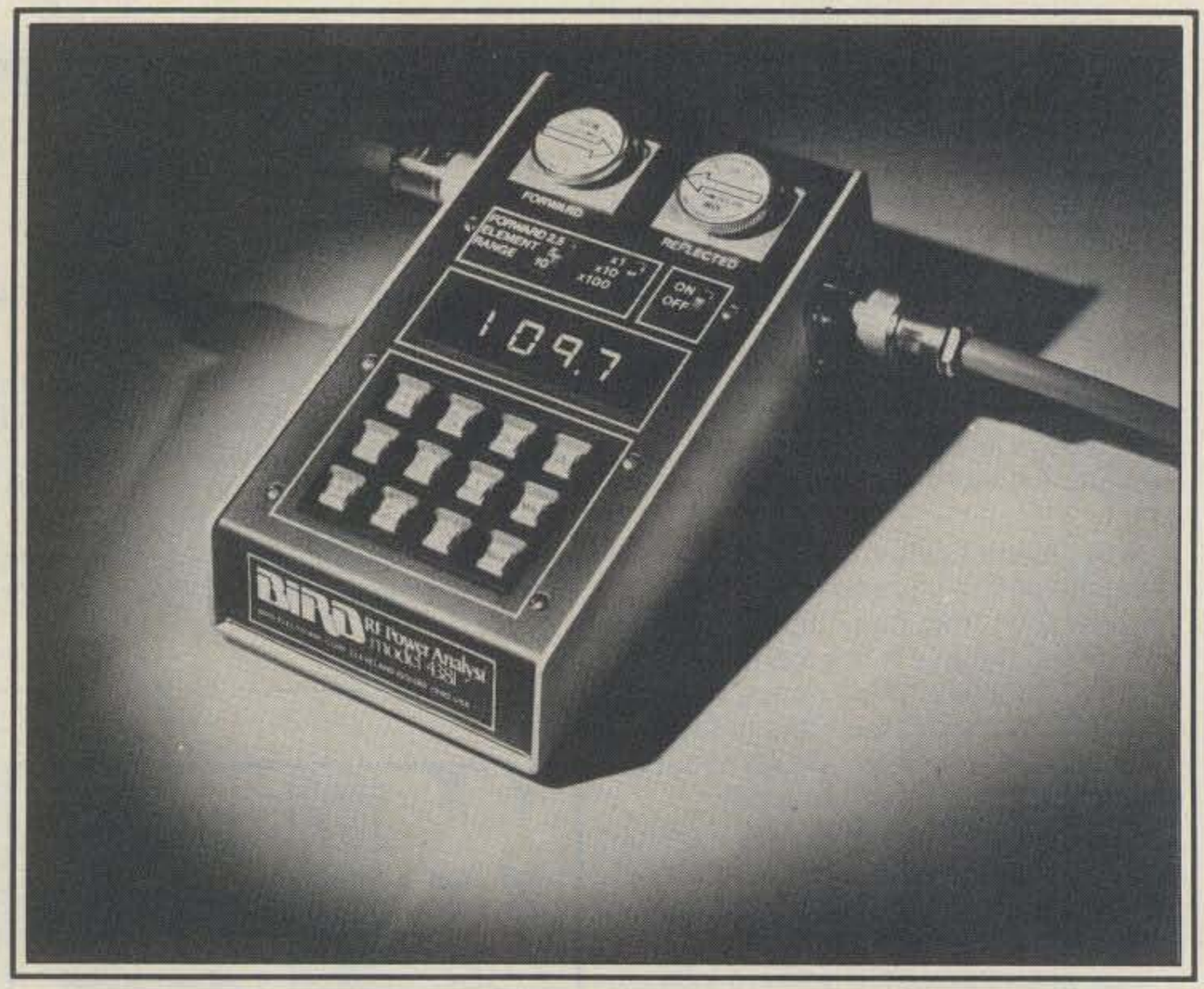
BY JOHN J. SCHULTZ*, W4FA

The Bird Model 4381 RF Power Analyst®

Bird wattmeters have been an industry standard for years. However, like most other instruments that once had analog displays, the new Bird wattmeter has gone to a digital display. But, the digital display is really only the tip of the iceberg. Bird no longer refers to the instrument as a wattmeter; they call it the RF Power Analyst®. The name change is not simply hyperbole, since the new instrument does indeed provide for a far greater range of measurement capabilities than the venerable old Bird Model 43 wattmeter. It is, in fact, a wattmeter designed around a microcomputer. Basically, the Model 4381 will do the following:

1. Display incident power in watts, or dBm.
2. Display reflected power in watts, or dBm.
3. Display incident PEP in watts.
4. Display reflected PEP in watts.
5. Calculate and display s.w.r.
6. Calculate and display dB return loss.
7. Calculate and display percent modulation.
8. Memorize a maximum and minimum level reading, as external adjustments are made, for resetability.

The specifications for the 4381 are shown in Table I. The frequency range (0.45 to 2300 MHz) and power range (0.1 to 10,000 watts) are both very broad and should satisfy just about any need. However, one cannot have a complete mix of the frequency and power ranges, since plug-in elements must be used to determine both the forward and reflected power and frequency ranges. A listing of the available elements is shown in Table II. They are the same elements as used in the Bird 43. The elements can be used alone or in pairs as desired. That is, if one only had one element, it could be used in the socket labeled "forward" or "reflected" to take power readings. Normally, however, one would use two elements with a lower power range element being used in the "reflected" socket. A typical pair for the h.f. range might be the 500 and 50 watt 2 to 30 MHz elements. Since the instrument has a 20% overrange, the 500 watt element is good for at least 600 watts forward power readings, while the 50 watt element will provide sufficient accuracy for measurements down to a few watts. To have the instrument display s.w.r., it is necessary that two elements be used which have a 10 to 1 power range (e.g., the 500 and 50 watt elements), and the transmitter being used has to provide a forward power of at least 10% of the power rating of the element used in the "forward" socket.



The plug-in elements used in the Model 4381 are the same as those used in the old Bird Model 43 wattmeter, but everything else is totally new. The 4381 is truly a power/s.w.r. "analyst" and not a simple wattmeter with a digital display.

A block diagram of the 4381 is shown in fig. 1. The forward and reflected elements provide low-level positive voltages proportional to the instantaneous value of power which they sense. The first group of solid state switches selects the forward element, the reflected element, or ground as the input to a preamplifier (not shown in the block diagram). The other switch groupings direct the output of the preamplifier through a positive or negative peak detector or directly to an analog to digital converter. The converter transforms the analog voltage to a 15-digit binary number which is then routed to the single chip computer. The keyboard and range switches direct the computer. The range switches only identify to the computer the nominal full-scale power value of the plug-in elements being used (e.g., for a 250 watt element in the "forward" socket, one switch would be set at "2.5" and the other at "× 100"). These switches do not serve any other function.

Nine push-button switches on the keyboard select the parameter to be measured: **Forward Power (CW), REflected Power (CW), SWR, Forward Power (PEP), Reflected Power (PEP), Percentage Modulation, Forward Power in dBm, Reflected Power in dBm, and Return Loss** (s.w.r. displayed in terms of how many dB the reflected power is down from the forward power). Three additional keyboard switches modify any selected parameter display so one can recall the last minimum or maximum reading achieved or have the display show whether the measured parameter is increasing or decreasing in value. The computer drives the display, which is composed of four seven-segment LED digits and which

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Power Range[1]	
Model 4381/83/85/87	100mW to 10kW full scale
4382/84/86/88	250W to 250kW full scale
Usable Over-Range	To 120% of full scale on CW, PEP, SWR and return loss functions. To 400% of scale (PEP) on dBm and % modulation.
Frequency Range[1]	
Model 4381/83/85/87	450 kHz to 2.3GHz
4382/84/86/88	2MHz to 1000 MHz
Sampling Rate	2-3 readings per second
Accuracies	
Power Readings	±5% of full scale
SWR	±10% of reading
% Modulation[2]	±5%
Return Loss	±0.3dB to corresponding SWR value (accuracy not guaranteed with components not supplied by Bird)
Modulation Frequency[3]	50-10, 000Hz
Impedance	50 ohms
Weight	
Model 4381	4.0 lbs. (1.8kg)
4382/83/84	2-1/4 lbs. (1.0kg)
Dimensions (Panel mount)	
Model 4385	19" x 6-21/32" (48.3 x 165mm)
4386/87/88	19" x 5-7/32" (483 x 133mm)
Power Requirements	
Battery - Models 4381/82/83/84	(Rechargeable Ni-Cad) Approx. 8 hours per charge
ac (Using. adapter/charger)	115V, 50-60Hz 6W or 230V, 50-60Hz 6W
ac (panel units)	115V, 50-60Hz 8W or 230V, 50-60Hz 8W switchable.

[1]Frequency band and power range is determined by Plug-in Element selected. See Bird Catalog for availability. Some modes require two elements in a 10:1 power ratio.

[2]For CW power levels greater than one third of full scale, accuracy of the % modulation mode is ±5% from 0 to 90% and +10% from 90 to 100%.

[3]For pulse modulation the minimum parameters are: 50 microseconds pulse width, 100 pps repetition rate and 1% duty cycle.

Table I– Bird 4381 RF Power Analyst® specifications.

Frequency (MHz)	Power Ranges (watts)
0.45–2.5	1000, 2.5 kW, 5 kW, 10 kW
2–30	50, 100, 250, 500, 1000, 2500, 5000
25–60, 50–125, 100–250, 200–500, 400–1000	5, 10, 25, 50, 100, 250, 500, 1000
60–80, 80–95, 95–125, 110–160, 150–250, 200–300, 275–450, 425–850, 800–950	1 watt
60–80, 80–95, 95–150, 150–250, 200–300, 250–450, 400–850, 800–950	2.5 watts
950–1260, 1100–1800, 1700–2200, 2200–2300	1, 2.5, 5, 10, 25
Pulse Mode only	
25–60, 50–125, 100–250, 200–500, 400–1000	2.5 kW, 5 kW, 10 kW

Table II– Table of standard plug-in elements.

is strobed digit by digit at about one digit per millisecond. In between strobing the display, the computer scans the keyboard to check if a new function has been selected.

As was mentioned before, the elements used in the 4381 are the same as those developed for the Model 43 wattmeter during the past 25 years. The detail of the operation of a single typical element is shown in fig. 2. The directional coupling in the element by a combination of mutual inductance and capacitance to the line section will have two voltages induced. The capacitively induced voltage is independent of the direction of the traveling waves on the line section, but the inductively induced voltage is directly related to the direction of the traveling wave. That is why the elements have to be physically oriented (note the upside-down mounting of the reflected element in the photograph) to correspond to whether they are being used to sense forward or reflected power. The directivity is in the order of at least 30 dB. The resultant induced voltage is then rectified by a crystal diode and the d.c. voltage processed

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No prior knowledge of Morse code is required to use the BT-1. There are no tapes to purchase or wear out. The BT-1 operates from a 12 VDC source or from the AEA 117 Vac wall adapter unit, AC-2. For portable use the BT-1P is available with Nicad batteries and comes with a charger that operates from 117 Vac. The unit can also be used in mobile settings via the 12 VDC system.

*Education Technology & Services, see page 81, October 1981 issue of Ham Radio Magazine.

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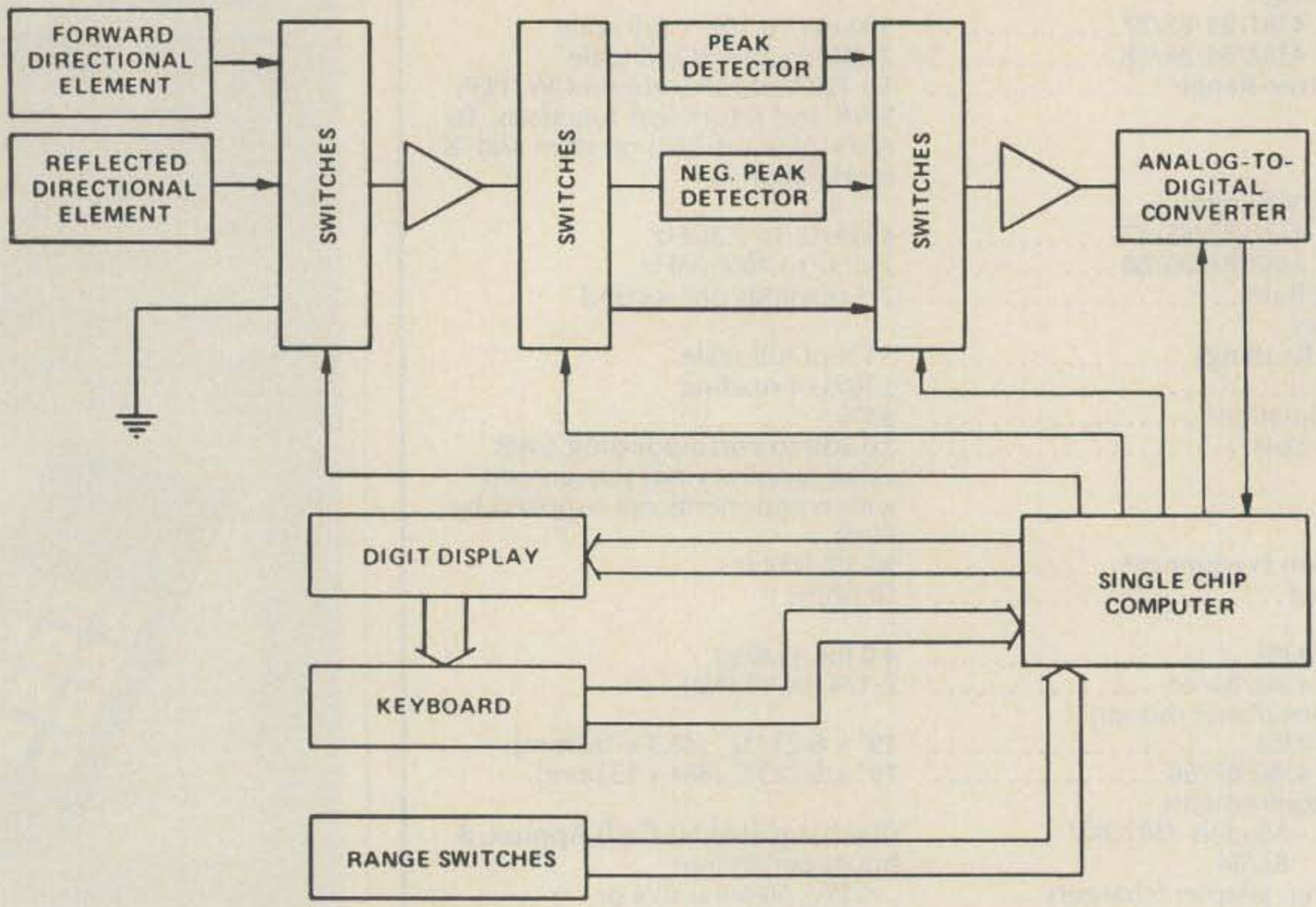

Fig. 1– Block diagram of the Model 4381.

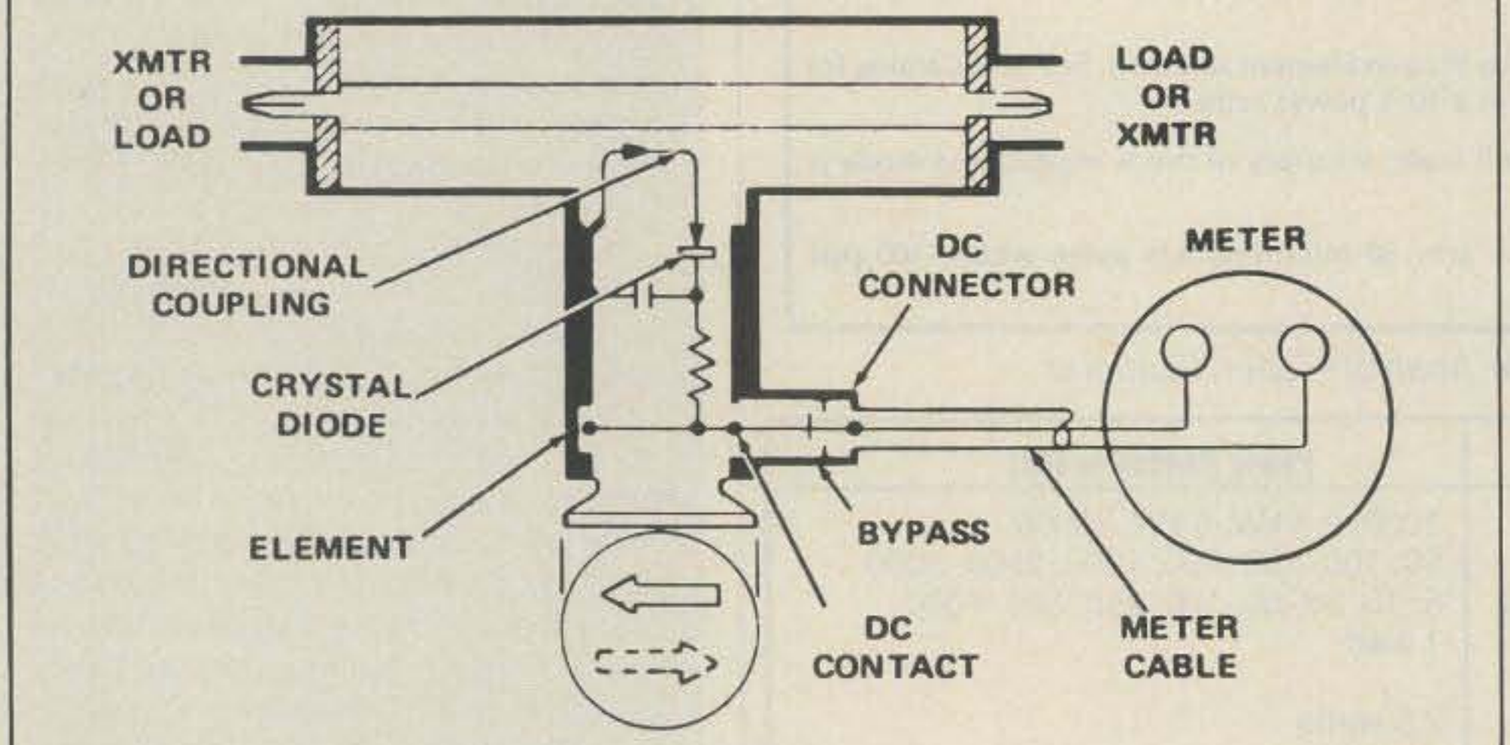

Fig. 2– Typical element circuit. Of course in the Model 4381 the output of an element does not go directly to a meter.

MODE	FORWARD	REFLECTED
FWD CW	X	
RFL CW		X
SWR	X	X*
FWD PEP	X	
RFL PEP		X
% MOD	X	
FWD dBm	X	
RFL dBm		X
RTN Loss	X	X*

***The reflected element must have a nominal power range one tenth that of the forward element.**

Table III– Elements necessary for specific measurements.

as previously described. The operation of the Bird elements is similar to that found in a conventional s.w.r. meter using parallel line pick-up elements, but the Bird elements are electrically balanced and designed to optimize directivity and accuracy for power readings.

Construction of the 4381 is very rugged, and it obviously was meant to take hard field usage. It is rather heavy (about 4 lbs.) and is not about to slide away on a workbench. The 4381 is powered with rechargeable batteries which will operate the unit for about 8 hours between overnight charging periods. It does come with an a.c. adapter/charging unit so it can be operated continuously if desired on a.c. power. In this mode the batteries will also be recharged, although at a slower rate than if the unit were turned off for recharging of the batteries.

The 4381 is extremely easy to use. After initial setup, one simply uses the keyboard to select any desired parameter. The display is bright and absolutely stable. The four digits of readout provide enough accuracy for any imaginable purpose. The minimum/maximum memory feature nicely solves the problem of making tuning adjustments while trying to watch a rapidly changing digital display. One can run through an adjustment from one extreme to another and then recall the minimum or maximum value, as desired, and retune to that exact value.

Professional users will find specific applications for the **Return Loss** reading feature, but if nothing else, it is educational. S.w.r. readings really do not convey much meaning. But to see how many dB

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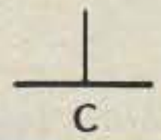
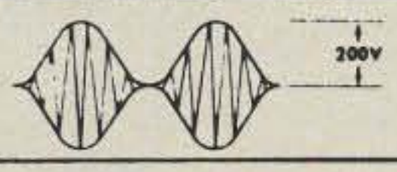
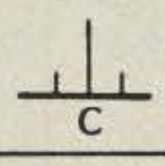
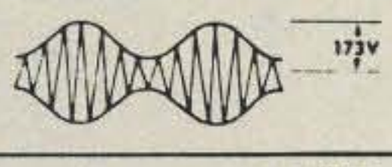
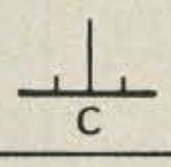
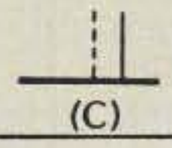
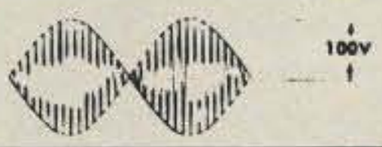
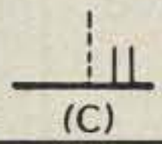
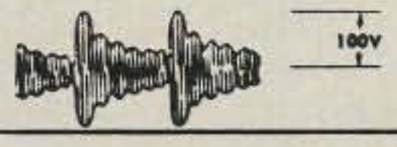
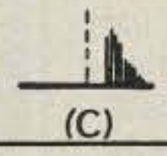
TRANSMISSION TYPE and SCOPE PATTERN	FREQUENCY SPECTRUM (C: Carrier)	PEVrms (arbitrary)	PEP = PEV^2_{rms}/Z_o	AVERAGE (Heating) POWER	4381 CW MODE	4381 PEP MODE	4381 % MOD MODE	MODEL 43
Table A CW		$\frac{100}{\sqrt{2}}$ V	100W	100W	100W	100W	0%	100W
Table B AM 100% Mod. 		$\frac{200}{\sqrt{2}}$ V	400W	150W	100W	400W	100%	100W
Table C AM 73% Mod. 		$\frac{173}{\sqrt{2}}$ V	300W	127W	100W	300W	73%	100W
Table D SSB 1 tone		$\frac{100}{\sqrt{2}}$ V	100W	100W	100W	100W	0%	100W
Table E SSB 2 tone 		$\frac{100}{\sqrt{2}}$ V	100W	50W	25W	100W	100%	40.5W
Table F SSB Voice 		$\frac{100}{\sqrt{2}}$ V	100W	–	–	100W	–	–

Z_o = 50 ohms ***PEV: Peak Envelope Voltage. Carrier (or suppressed carrier) PEV was arbitrarily chosen at 100 volts in all examples. $PEV_{rms} = PEV/\sqrt{2}$.***

Fig. 3– A comparison of the readings obtained on the Model 4381 and the Model 43 instruments for different waveforms.

reflected power is from forward power really conveys a message.

The 4381 can also do a number of things that analog meters are not capable of doing. For instance, fig. 3 shows the readings obtained on the 4381 when measuring different waveforms as compared to the reading on a Model 43 meter. Note the wealth of information produced concerning an s.s.b. signal compared to the minimal information provided by the analog meter. The 4381 is also sensitive enough to make some unusual measurements. For instance, on a c.w. signal if a difference is noted between the PEP and c.w. readings, one might suspect hum. If the percentage modulation reading is then selected, one can measure down to 1% ripple of hum on a carrier.

A few checks were made to verify the accuracy of the 4381 by simulating different s.w.r.'s, power levels, etc. As it turned out, the 4381 was far more accurate than any instrument on hand that could be used to verify the simulated conditions.

The 4381 is essentially a professional, laboratory-type instrument that has capabilities far beyond the usual measuring instruments available in an amateur radio station (e.g., a power-measuring capability ranging from milliwatts to kilowatts and an s.w.r. measuring capability up to 99.9 to 1!). Its design concept is extremely interesting, and undoubtedly its features are a forerunner of those which will gradually appear on simpler "SWR/Wattmeter" meter products aimed at the amateur radio market. The Bird Model 43 remained a "standard" for some 25 odd years, and it would more than appear that the Model 4381 will have a similar future.

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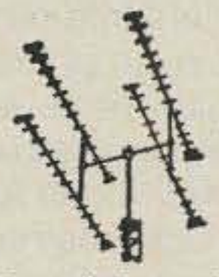

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CIRCLE 55 ON READER SERVICE CARD

Awards

a monthly feature by
DOROTHY H. JOHNSON, WB9RCY

NEWS OF CERTIFICATE AND AWARD COLLECTING

Wes, WAØYFQ, and Flo, KU7F, just before she left to get his very last county.

The Story of the Month for July as told by Wes is:

Wes Lynn, WAØYFQ
All Counties #363, 3-8-82

"I got into amateur radio by passing both the Novice and General class tests at the same time in March 1969. I was employed by the Rock Island Railroad for 27-plus years as a telegraph Operator-Agent and had two years of service in the United States Army as a radio operator, so code was no problem. Trying to keep the two codes separate was the big headache. I knew what was sent—just had to fit the letters together in the right order.

"I got into County Hunting shortly after getting on the air after an eyeball meeting with Phil, WAØEVO, USA-CA All Counties #11, at Cherokee, Iowa, in September 1969. I was so impressed with the award that I came home and started making contacts, mostly on 75 meters. Finally I got up to 2500 counties confirmed and sent for USA-CA 2500 Mixed in November of 1974. Then family and work interfered for three or four years and I only worked counties while on vacation operating mobile.

"I began working with a Heathkit SB-101 both base and mobile, and finally in December 1980 I purchased a used Atlas 180 for mobile use. This got my interest back and I worked many counties quickly. I got down to the last 50 or so and then began to wonder if they would ever come. By wiring a couple of outboard speakers into the house I found I could listen to the 20 meter net while watching the tube, eating dinner, etc., much to the consternation of the XYL. She was glad when I finished All Counties. She does all my logging except when we are on a county line.

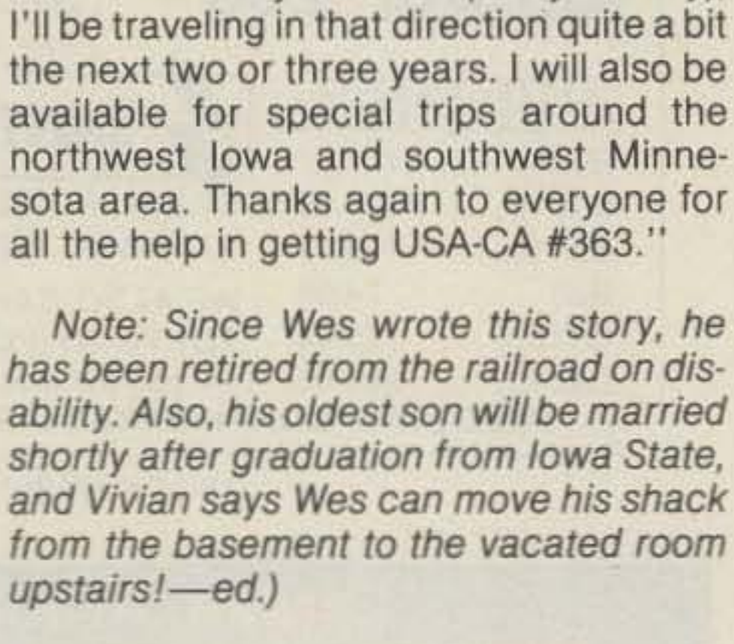
"I still have the SB-101 on base and use a TA-33 at 46 feet for an antenna. I am also very active in REACT, SKYWARN, and two local radio clubs, using primarily 2 meter f.m. for local contacts. I have two mobiles and a portable for 2 meters.

"I can't begin to thank all the people who helped me out in the final stretch, but much credit must go to Arnie, K9DCJ, for all those call signs for various counties needed, and a big thanks to Bill, KA4TWK, a brand new mobiler, who went out of his way to get my next to the last, Rabun County, Georgia. A very special thanks to Flo, KC7BU (now KU7F), for the very last county, Jefferson County, Oregon. Since I had four weeks or so to think about the last county, I had many letters back and forth with Flo, and got her OM to take pictures of her on the county line. Those pictures are now on the wall next to the plaque.

"I will continue to put out the counties for the net, and with two boys in Iowa State University at Ames (Story County), I'll be traveling in that direction quite a bit the next two or three years. I will also be available for special trips around the northwest Iowa and southwest Minnesota area. Thanks again to everyone for all the help in getting USA-CA #363."

Note: Since Wes wrote this story, he has been retired from the railroad on disability. Also, his oldest son will be married shortly after graduation from Iowa State, and Vivian says Wes can move his shack from the basement to the vacated room upstairs!—ed.)

333 South Lincoln Ave., Mundelein, IL 60060



Wes and the cornfields of Iowa. Photo was taken in March.

WAØYFQ, with his fine station and All Counties Award #363.

Special Honor Roll
All Counties
#418 Jerry Pollard, NØCKN 3-18-83.

Awards Issued

Jerry Pollard, NØCKN, took time from his busy schedule to complete all the paperwork and claimed USA-CA-3000 #447 and All Counties #418, 3-18-83.

Victor Brosnan, ZL2ACP, sent for USA-CA 500 through 2000 endorsed Mixed. Many of the County Hunters remember Vic for the fine job he did running counties in the United States last summer.

Dr. Hans Schneider, DL7CS, added USA-CA 1500 endorsed All C.W. to his collection.

George W. Lee, K5HT, qualified for USA-CA 1500 All S.S.B.

Hiroyuki Ogawa, JA8DNZ, claimed USA-CA 1000.

Jahani Leinonen, OH1FS, Awards Manager for OH1AA, Turun Radiomatooritry, collected USA-CA 1000 for the Club. The first 500 counties were endorsed both C.W. and S.S.B., the second 500 counties were endorsed Mixed. This is the first such award issued to Finland, and the first USA-CA 1000 to Finland.

Ellis Fenical, KA9GZM, obtained USA-CA 1000 endorsed Mixed.

USA-CA 500 and USA-CA 1000 all 20 meter S.S.B. were issued to Juan Jose Rosales, EA9IE. This is the first USA-CA Award issued to Ceuta.

USA-CA 500 certificates were awarded to:

Regis K. Kramer, W4ILE

Say You Saw It In CQ

Dr. Hans Schneider, DL8RL
Radioclub Telsa, OK1KPA (Vlado Domagalsky, OK1AFC, Awards Manager)
Jaroslav Gala, OK3-4592
Pietro Fiorito, IN3ANE
Koji Endo, JH8MFS
Karabelas Anthimos, SV1EX
Walter Newman, WB3HTK
Cary Wallace, KM1I

Awards

Diplomas Islas Canarias: This award will be granted to radio amateurs and listeners from all over the world who have contacted different EA8 stations after April 29, 1971, in any band or mode.

Requirements: Spain (Mainland, Balearic Islands, Ceuta-Melilla), 60 different EA8 stations. Portugal, Madeira, 60 different EA8 stations. Rest of Europe and Morocco, 40 different EA8 stations. South and Central America, including Mexico and the Caribbean, 30 different EA8 stations. U.S.A., Canada, Africa, 20 different EA8 stations. Asia, Oceania, 10 different EA8 stations.

Applicants need not have received the QSL's but must produce a list of the contacted EA8 stations in alphabetical order, indicating date, band, and mode. Lists must be signed by two radio amateurs who have verified the applicant's log.

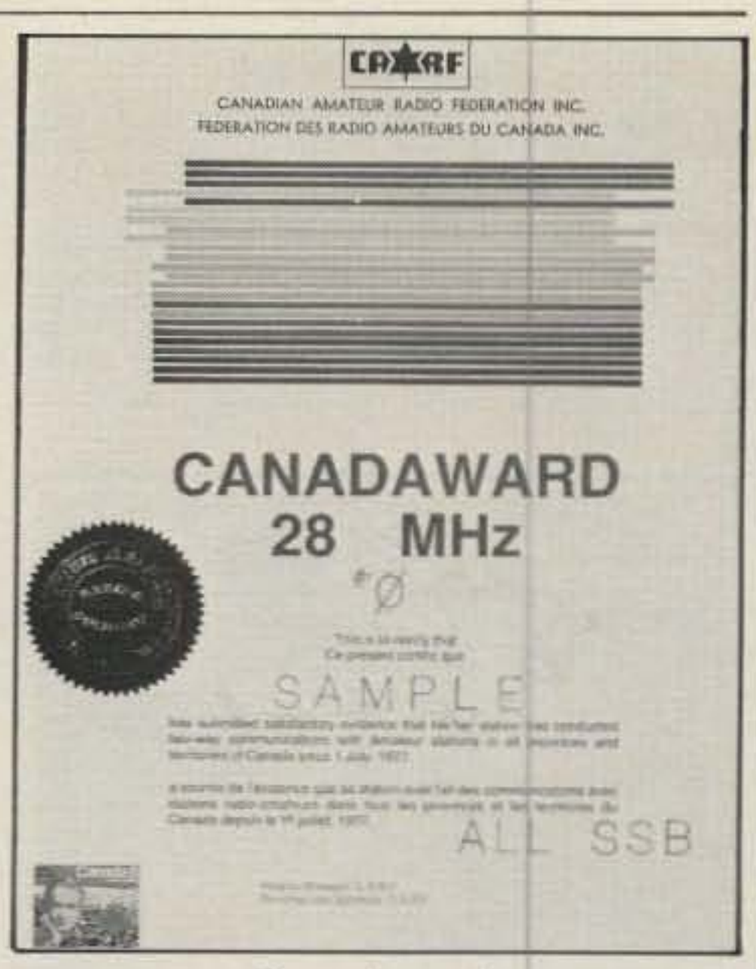
Send 10 IRC's or 200 Pesetas together with your list to the following address: Diploma Islas Canarias, P.O. Box 860, Las Palmas De Gran Canaria, Canary Islands, Spain.

Canadaward: The Canadian Amateur Radio Federation is pleased to announce the following awards available to all radio amateurs worldwide.

Canadaward is a colorful certificate to be issued to any amateur who confirms two-way QSO's with all Canadian provinces and territories. All QSO's must be on one band only. Separate awards are issued for each band on which the applicant qualifies (12 cards per band—see list below). A mode endorsement is available if all QSO's are made on the same mode (c.w., s.s.b., RTTY, SSTV). Contacts made after July 1, 1977 only will count for this award. Submit the 12 cards with $2.00 Canadian or U.S. funds or 10 IRC's plus sufficient funds for return postage. CARF members need only send funds for return postage.

5 Band Canadaward—A special plaque is available to any amateur who confirms two-way QSO's with all Canadian provinces and territories on each of five separate bands (total of 60 cards, 12 cards per band—see list below). Contacts made after July 1, 1977 only will count for this award. Submit the 60 cards with $25.00 Canadian or U.S. funds plus sufficient funds for return postage.

List of Canadian provinces and territories: VO1/VO2 Newfoundland/Labrador, VE1 Prince Edward Island, VE1 Nova Scotia, VE1 New Brunswick, VE2 Quebec, VE3 Ontario, VE4 Manitoba, VE5 Saskatchewan, VE6 Alberta, VE7 British Columbia, VE8 Northwest Territories, VY1 Yukon Territory. Note: VO2, Labrador, is part of the province of Newfoundland and counts for Newfoundland.



Canadaward.

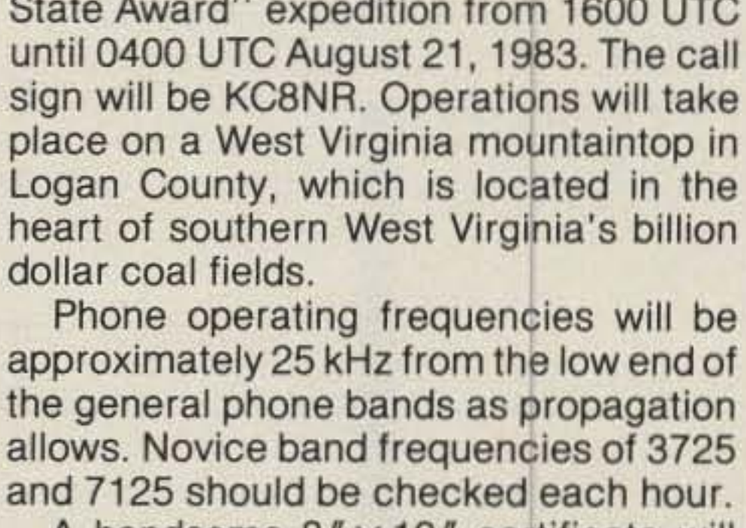
All amateur bands may be used. Each distinct satellite mode (432 in/144 out, 144 in/29 out, 144 in/432 out, etc.) will count as a separate band.

Mail applications for Canadawards to: P.O. Box 2172, Station D, Ottawa, Ont., Canada K1P 8W4.

Mountain State Award: The Logan County ARC will hold its third annual "Mountain State Award" expedition from 1600 UTC until 0400 UTC August 21, 1983. The call sign will be KC8NR. Operations will take place on a West Virginia mountaintop in Logan County, which is located in the heart of southern West Virginia's billion dollar coal fields.

Phone operating frequencies will be approximately 25 kHz from the low end of the general phone bands as propagation allows. Novice band frequencies of 3725 and 7125 should be checked each hour.

A handsome 8″ × 10″ certificate will be awarded to all contacts submitting a QSL and legal-size envelope to: Basil Napier, WD8KWC, RFD 1, Box 198, Chapmanville, WV 25508.



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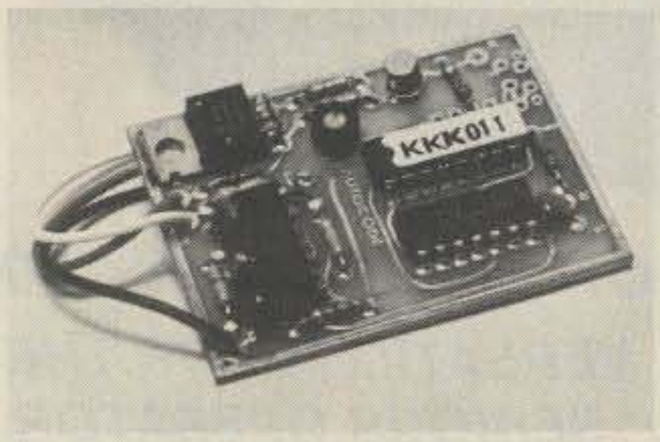

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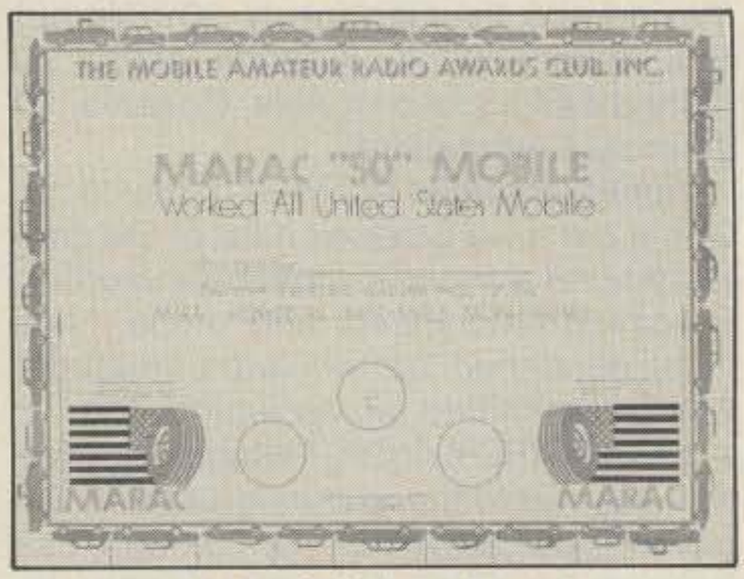
ZL2ACP	563	KA9GZM	773	JH8MFS	1821
				SV1EX	1822
1500				OH1AA	1823
ZL2ACP	629	500		WB3HTK	1824
DL7CS	630	ZL2ACP	1815	EA9IE	1825
K5HT	631	W4ILE	1816	KM1I	1826

Koji, JH8MFS, at his station in Hokkaido.

DX Mobile Award: The DX Mobile Award is issued by the Mobile Amateur Radio Awards Club (MARAC) for working 25 DX countries while operating mobile. Red seal and ribbons for 50, blue seal and ribbons for 75, gold seal and ribbons and MARAC for working 100 DX stations while operating mobile. Current ARRL countries list is honored. DX station can be fixed, mobile, or portable. Mobiles working for this award may be operated from any state and with any assigned call. Aeronautical or maritime mobile must be within the territorial limit of the country given out. Fee $1.25; seals for s.a.s.e.; plaque $15.00.

MARAC 50 Mobile Award—Issued to any amateur (s.w.l. on heard basis) working mobiles in all 50 states from fixed, mobile, portable, or combination of such. Original award for 48 states, red seal and ribbons for 49, blue seal and ribbons for 50. Gold seal and ribbons for working all states mobile to mobile. Fee $1.25; seals for s.a.s.e.

Send applications for MARAC awards to: MARAC Awards Chairman, Dr. Thomas E. Storm, KBØKS, 409 S. Mt. Carmel, Wichita, KS 67213.



MARAC Mobile Award.

MARAC "DX" Mobile Award.

Notes

As you all know by now, Ed Hopper, W2GT, who did such a magnificent job for 18 years as USA-CA Custodian and Awards Columnist for *CQ* magazine, has decided upon a change of pace, and I have undertaken to continue his work. Ed spent many long hours explaining the procedures to me and preparing the records, etc., for transfer. I shall try very hard to maintain the integrity of the USA-CA Award and to keep the column interesting to everyone, as Ed has done over the years. Thank you all for your telephone calls and letters of encouragement.

73, Dorothy, WB9RCY

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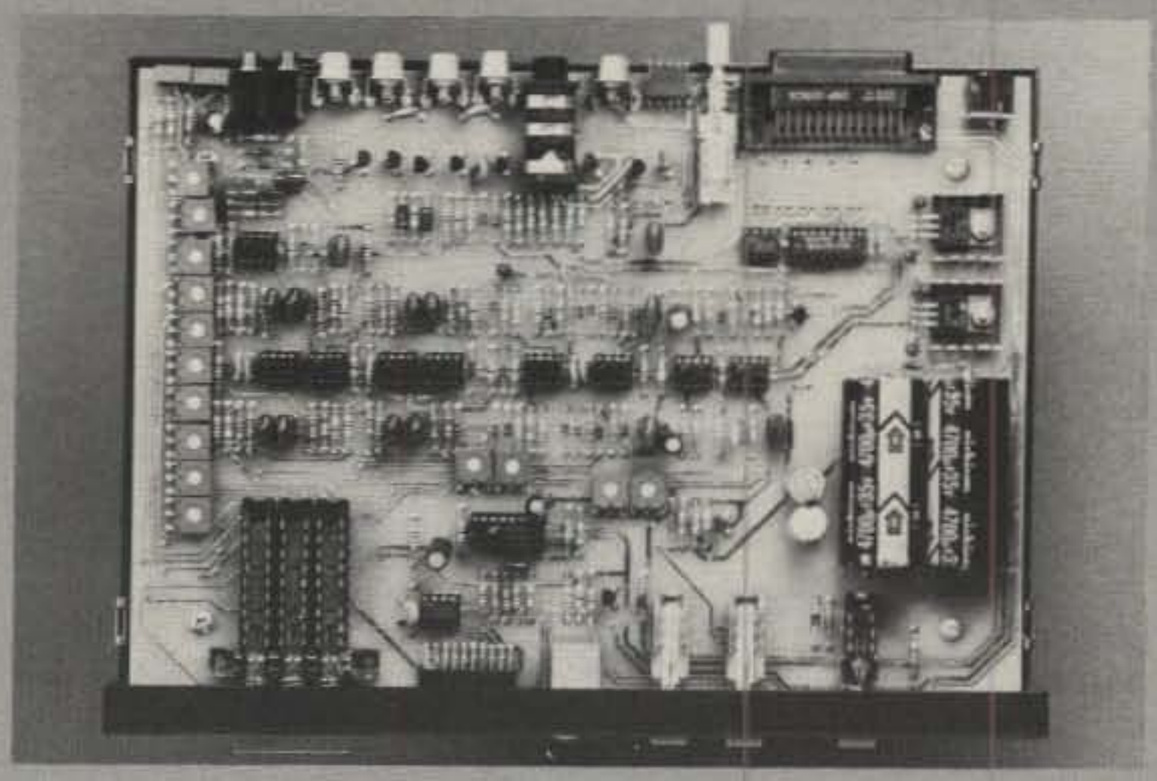

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The CP-1 offers variable shift capability in addition to fixed 170 Hz dual channel filtering. Auto threshold plus pre and post limiter filters allow for good copy under fading and weak signal conditions.

Transmitter AFSK tones are generated by a clean, stable function generator. Plus (+) and minus (-) output jacks are also provided for CW keying of your transmitter. An optional low cost RS-232 port is also available. The CP-1 is powered with 16 VAC which is supplied by a 117 VAC wall adaptor included with the CP-1.

CIRCLE 14 ON READER SERVICE CARD

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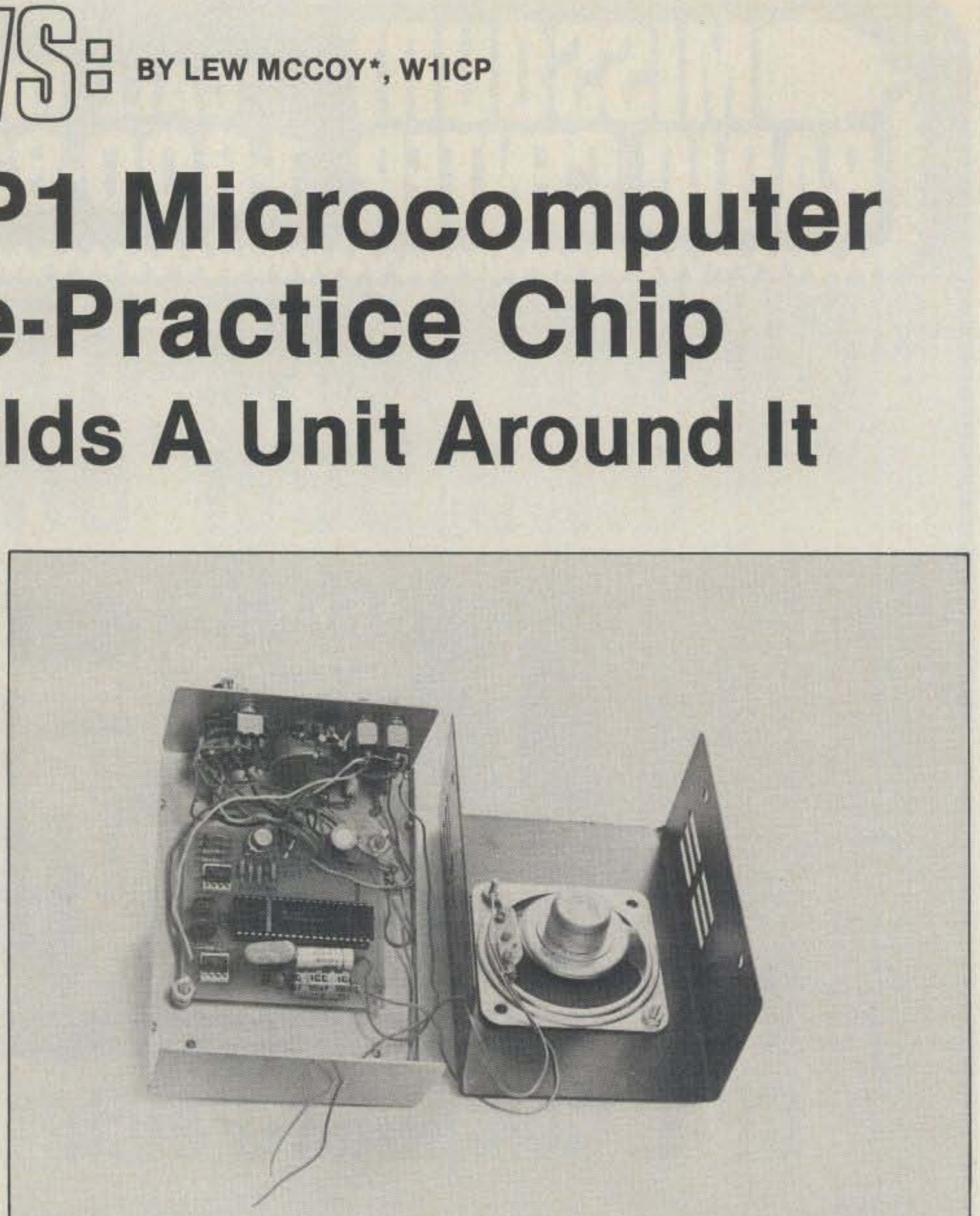
CQ REVIEWS:

BY LEW MCCOY*, W1ICP

The CPP1 Microcomputer Code-Practice Chip And Builds A Unit Around It

A recent development of Micro Digital Technology is the CPP1 microcomputer chip. This chip is a complete microprocessor that is designed as a teaching aid for learning Morse code. It does away with the problem of cassette tape recordings (and records). In addition to being a code-practice source, it doubles as an iambic digital keyer. In other words, once the owner passes his or her exams and gets a license, the chip will go on in service as a keyer.

In my case, I could have reviewed the product and let it go at that, but this looked like a nice item to do a construction article around, so that is what you have here. This article will review the CPP1 plus show how to build a unit using it. Clubs and groups interested in conducting code classes will find this a very useful device to provide the necessary code knowledge for a person to pass the exams. Also, the unit described here can be used as a keyer for the club station or on field-day activities.



Here is a view of the completed code-practice/keyer unit. I could have used an even smaller box, but this one was on hand. The circuit board is mounted on ¼ inch standoffs from the bottom of the case. I installed all the leads for the switches on the board before installing the board and then made the switch connections. Additionally, I installed a single-pole toggle on the front panel which controls the 5 volts d.c. on/off. The two leads coming out the back are for the d.c. supply: one is d.c. plus and the other is ground, or minus.

The CPP1 Description

The 40-pin IC1 (fig. 1) is a single-chip microcomputer. Contained in this 40-pin package are 128 bytes of RAM (random access memory), 2K of ROM (read only memory), an 8-bit CPU (central processing unit), a reset circuit, a clock, and predefined I/O (input/output) ports. It is practically a complete system in silicon.

Circuit Details

The circuit for the completed code-practice/keyer unit is shown in fig. 1. First, let's talk about the CPP1 itself. Of course, much of the information about the chip is proprietary, so the discussion will cover those items which can be mentioned. As mentioned above, the chip has considerable memory (software), which is utilized for storing the various practice tables.

There are 15 practice tables built into the CPP1, and these can be accessed via **S1** and **S2**. Six of these tables contain the basic alphabet, numbers, and punctuation. Six more tables correspond to the first six practice groups; however, the characters are arranged in five-character words. There is one table of numbers and another of only punctuation. The final table contains all the characters arranged into five-character words. The selected table can be started by pushing the start switch, **S3**, and it will run until stopped by **S4**.

The code speed is set by **R7**, which is used to adjust the timing sequence on a dot clock, IC2, a one-shot. Code speeds from 1 to 100 words per minute are available. IC3 is a 500 Hz tone generator and has plenty of audio available; in fact, the unit is loud enough to be heard anywhere in a large classroom.

The electronic keyer option is available with side tone, when **S3** is pressed and either the **DOT** or **DASH** terminal is closed to ground. When either is activated, an open collector, on Q1, is turned on with the tone. This open collector can be used to drive an external relay to gate the transmitter being keyed.

Power-supply requirements are 5 volts at about 25 or so milliamperes. Three 1½ volt flashlight cells connected in series (4½ volts) would provide an excellent and inexpensive supply. The total current drain when in full operation is only about 50 milliamperes, so the battery life should be very long.

*Technical Consultant, CQ, 200 Idaho St., Silver City, NM 88061

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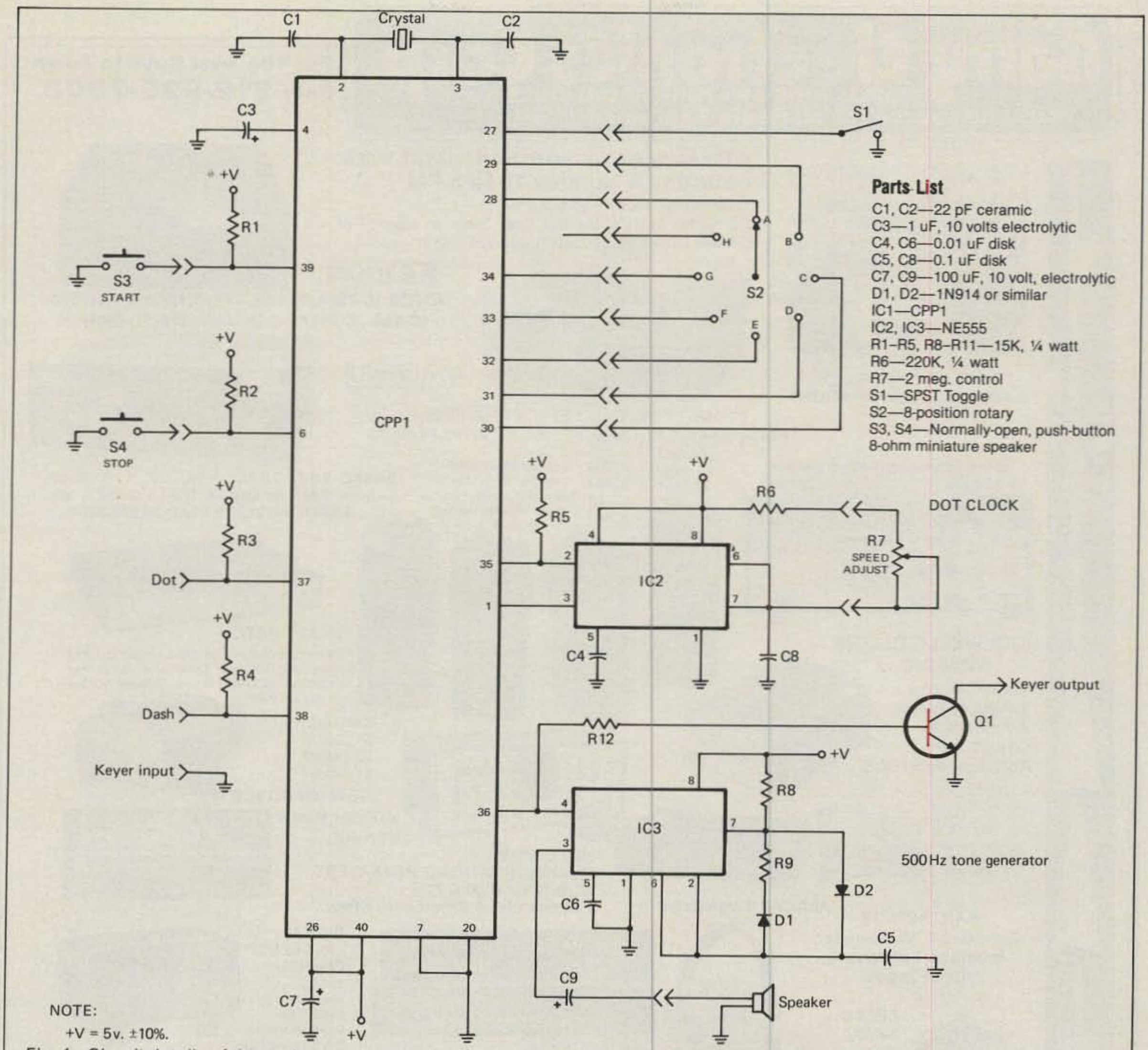

NOTE:
+V = 5v. ±10%.

Parts List

C1, C2—22 pF ceramic
C3—1 uF, 10 volts electrolytic
C4, C6—0.01 uF disk
C5, C8—0.1 uF disk
C7, C9—100 uF, 10 volt, electrolytic
D1, D2—1N914 or similar
IC1—CPP1
IC2, IC3—NE555
R1–R5, R8–R11—15K, ¼ watt
R6—220K, ¼ watt
R7—2 meg. control
S1—SPST Toggle
S2—8-position rotary
S3, S4—Normally-open, push-button
8-ohm miniature speaker

Fig. 1– Circuit details of the code-practice/digital-keyer unit. In addition to the parts in the list, if the keyer option is desired, then R12 is 4.7K, ¼ watt, and Q1 is a 3904 or the equivalent. A complete kit of parts, including PC board and enclosure, is available from Radiokit, Box 411, Greenville, NH 03048. Their price is $44.50 plus $2.50 shipping. They also have the electronic keyer option available for an additional $2.50.

Construction Notes

Micro Technology has a printed circuit board available ($5.00) which I used in constructing the unit shown in the photographs. The entire keyer was built and fitted into a Radio Shack utility cabinet that measures 4" × 2⅜" × 5⅞".

A parts list is enclosed with the chip, and it is the same as that shown with fig. 1. However, a few remarks might help the prospective builder. My junk box didn't have any 15K resistors, but I did have a supply of 22K units on hand. I tried values from 12K to 27K and they all worked okay, so whatever your junk supply yields might be worth trying before buying exact values. Also, C1 and C2 are specified as 22 pF; I only had 47 pF and they worked

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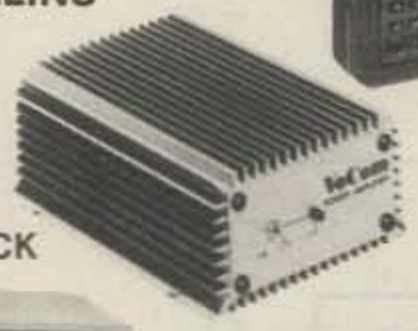

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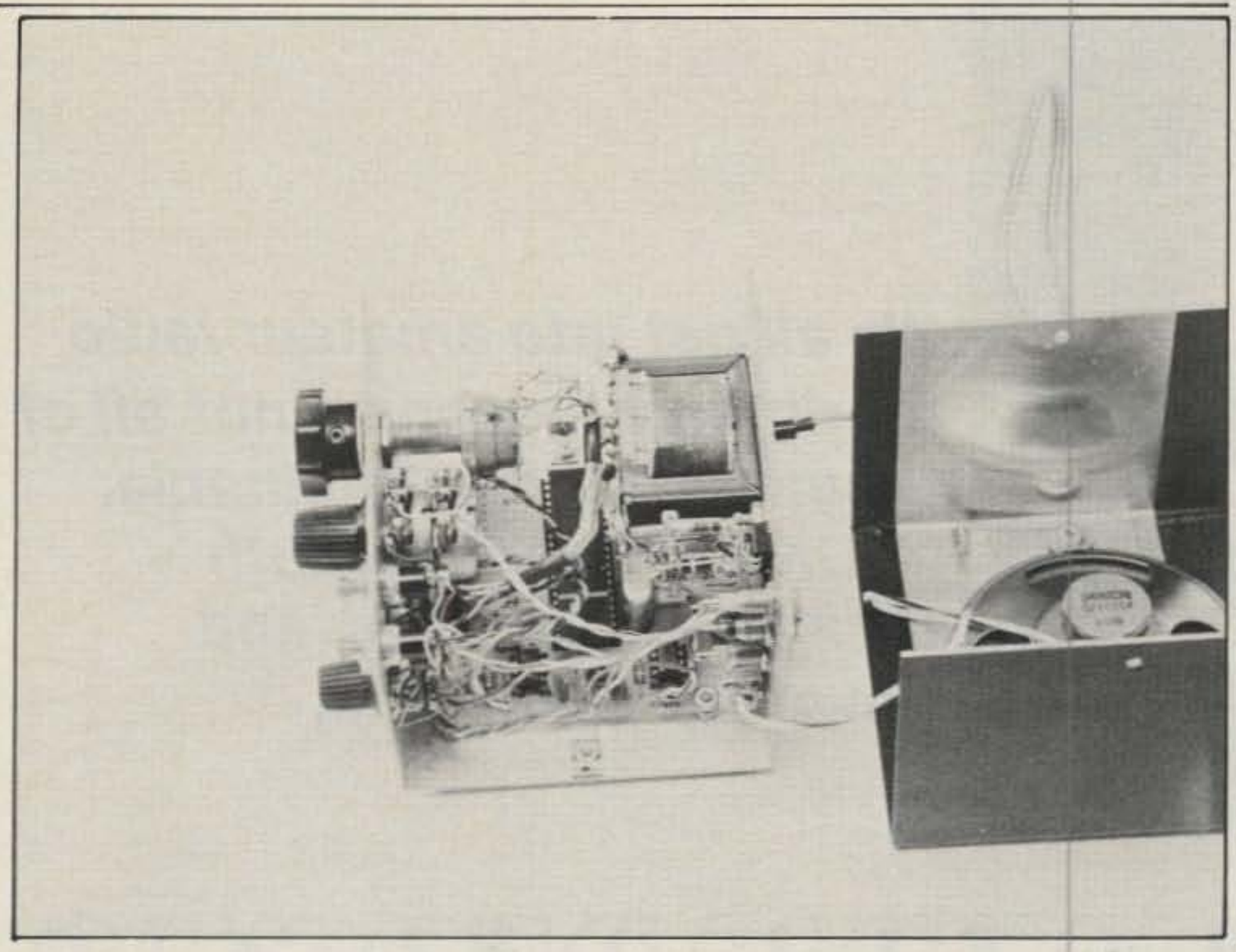
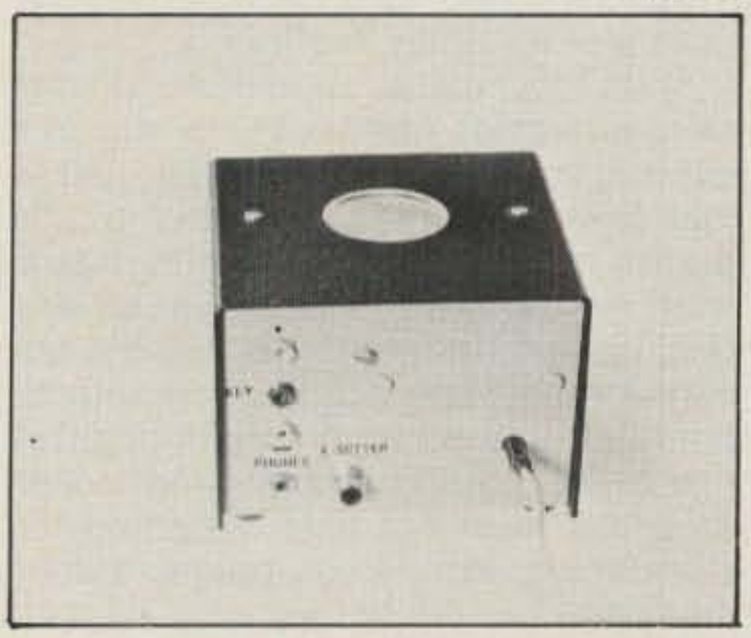


This is another version of the code practice/keyer unit. This one was built by Dean Battishill, W5LAJ. Dean did a more compact job of construction than I and added several features not shown in fig. 1. W5LAJ added a tone control, volume control, and earphone jack, plus a self-contained power supply. These modifications are shown in fig. 2. To the right on the back panel are the power transformer, with power supply components, and the digital keyer jacks. The circuit board with its components is barely visible at the bottom of the case. On the front panel at the upper left are S3 and S4 (at the top) and just below is S1. In the center is the speed control and at the far side is the program switch.



Shown here is a back view of W5LAJ's unit. The keyer terminals are at the upper left and immediately below is the headphone jack.

Front of the code-practice/keyer unit.

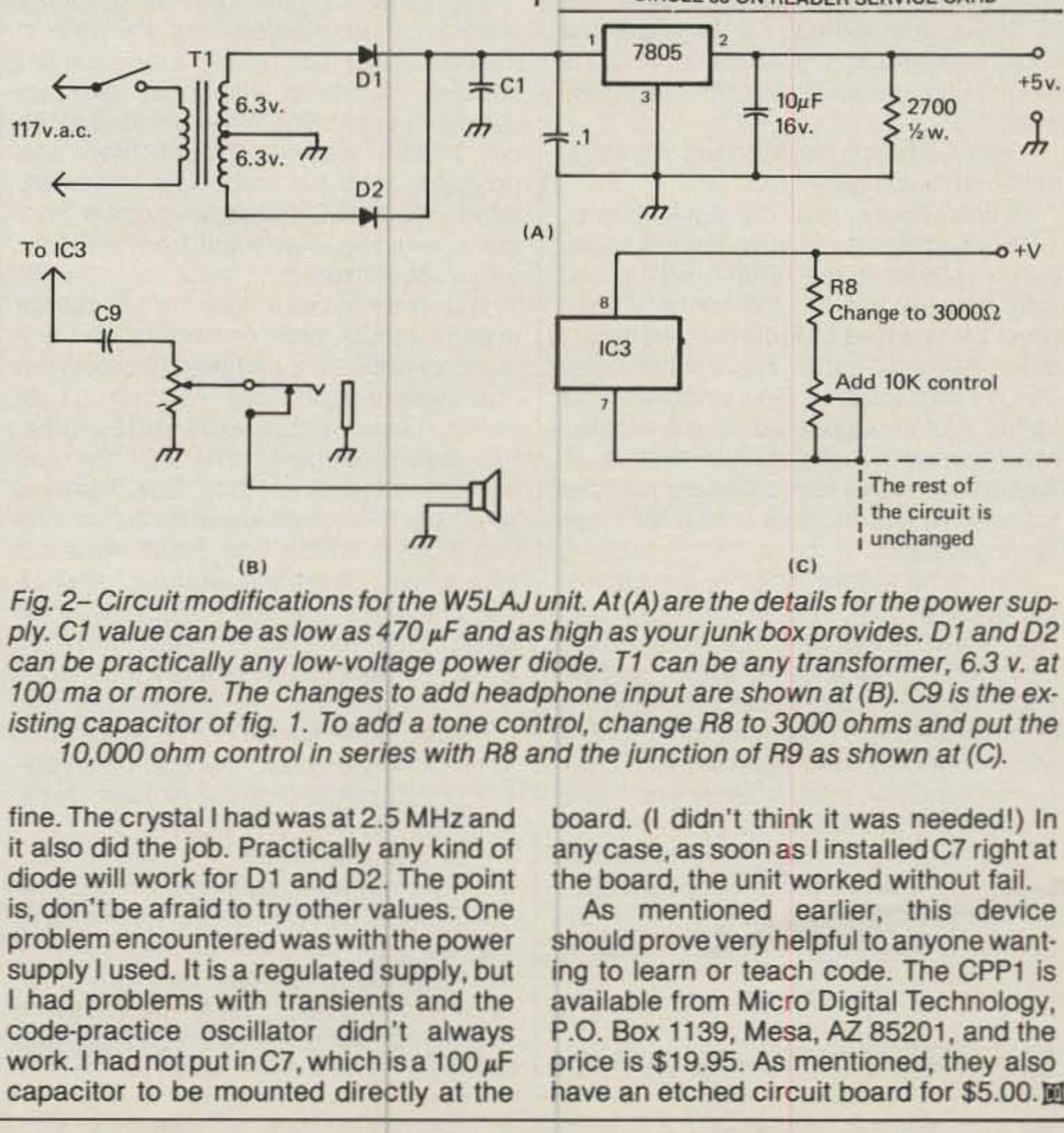


Fig. 2– Circuit modifications for the W5LAJ unit. At (A) are the details for the power supply. C1 value can be as low as 470 µF and as high as your junk box provides. D1 and D2 can be practically any low-voltage power diode. T1 can be any transformer, 6.3 v. at 100 ma or more. The changes to add headphone input are shown at (B). C9 is the existing capacitor of fig. 1. To add a tone control, change R8 to 3000 ohms and put the 10,000 ohm control in series with R8 and the junction of R9 as shown at (C).

fine. The crystal I had was at 2.5 MHz and it also did the job. Practically any kind of diode will work for D1 and D2. The point is, don't be afraid to try other values. One problem encountered was with the power supply I used. It is a regulated supply, but I had problems with transients and the code-practice oscillator didn't always work. I had not put in C7, which is a 100 µF capacitor to be mounted directly at the board. (I didn't think it was needed!) In any case, as soon as I installed C7 right at the board, the unit worked without fail.

As mentioned earlier, this device should prove very helpful to anyone wanting to learn or teach code. The CPP1 is available from Micro Digital Technology, P.O. Box 1139, Mesa, AZ 85201, and the price is $19.95. As mentioned, they also have an etched circuit board for $5.00.

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AN HT IN MY DIAPER BAG

BY LYNN W. BADGETT*, N8DKD

I resisted getting my amateur radio license for eleven years. My husband, Tom, K8AO, has been a ham for almost 25 years and wanted me to share the pleasures and the usefulness of communication capabilities with the whole world.

"When are you going to get your ticket?" he would ask.

"I don't know," was my stock answer.

My excuses were many. I didn't speak the language: ohms, amps, watts, and volts all were vaguely the same to me. I wasn't interested in technical matters. I didn't have the time. There were other things I wanted to do. One amateur in the family was enough. I would start tomorrow (next week, next month, next year). Besides, I mildly resented being referred to as an XYL (emphasis on the X)! I was *not* interested.

I am a ham now. What finally pushed me into hamdom was pregnancy. No, I didn't have a nervous breakdown or a profound personality change due to churning hormones. I finally realized the enormous communications tool I'd have at my fingertips. Two meters is very big in our community, and I already knew several of the local amateurs by voice, call, and name. It occurred to me that when D-Day came and I had to go to the hospital, Tom's work schedule just might render him unavailable. How nice to pick up a handheld and call somebody—anybody—to drive me to the hospital.

Such was my initial reasoning. As my pregnancy progressed, and we were in the process of moving into a new home, I became aware of additional uses for handheld capability. While working at the new house, I was out of touch; there was no phone, and our home was rather isolated. My growing waistline was a constant reminder that a fall from a ladder could spell disaster.

I started what was to be a crash course in code, theory, radio procedure, and regulations while on a camping vacation the first week of September. As soon as I got home, I began regular work with the practice code broadcasts on W1AW. I bought a practice tape and study book. Tom had several books which were helpful: an Ameco license guide; the *Radio Amateur Handbook, Operating Manual,* and *License Manual* from the ARRL; and an old *Basic Electricity* text. I had only five weeks of formal study before my scheduled test on October 14. Tom assured me, however, that I had absorbed a lot of information by osmosis through the years, and I might not be in shape to travel by the next test session. So I went for it.

I passed the written test with no trouble. My code wasn't quite up to speed for the General, so I opted for a Technician's license. That gave me access to the 2 meter band, which had been my goal. (Now Tom nags me, "When are you going to get your code speed up and get your General?" Will it never end?)

I already had my radio, a Yaesu FT-208R. I impatiently waited for my license. At last the magic slip of paper arrived and I had a new identity: N8DKD.

Soon I found another useful aspect of amateur radio. After working late one evening I came out of the building just as four teenagers, bored with the arcade across the street and looking for a lark, lifted my car and moved it over several feet. I yelled for them to stop, visions of a ruined transmission, broken steering column lock, and worse running through my head. The boys heard me and looked around. I must not have appeared too threatening, an obviously pregnant woman alone.

They began to move away from the car, laughing. They thought it was a huge joke. I decided it was time someone else knew what was going on. I lifted my radio to my mouth, gave Tom's call and mine, and watched with pleasure as their careless grins turned to astonished stares. When Tom answered me, the four melted away into the darkness with amazing speed.

My radio enabled me to make two business trips the next month. I had conferences about 200 miles from home that I really needed to attend. With the security and assurance of radio contact with the world, I had no hesitancy about driving so far alone, even in the sixth month of pregnancy. To my colleagues' questions, "You mean you drove all the way alone? At night?" I could casually respond, "Of course. I had my radio."

*508 Woodland Dr., Bluefield, WV 24701

Say You Saw It In CQ

So it was that I checked into the hospital at 5:30 one blustery March morning with my Yaesu locked in my suitcase. Our daughter, Jordan, was born at 1:03 the following morning. We exulted a little while, and then Tom left for some much needed rest. I felt I could sleep for days.

I was wide awake and starving by 6:30 a.m. I waited until what I thought was a decent hour (7:00) and called Tom. He, too, was too excited to sleep. In my state of euphoria, I forgot that all the hams in town probably were on frequency at that hour. Our broadcast giddiness spread the news in a hurry. The announcement was made general knowledge in record time, even for our small town.

Later that day my doctor came in to check on me. I was talking to Tom, and asked him to wait while I answered the doctor's questions. The doctor looked at my radio and asked what it was. When I explained, he shook his head in amazement and disbelief. He asked if I could use it like a phone, too. When I told him about auto patch, I could see the wheels turning in his head, thinking of the possible uses. My radio became an object of curiosity and comment from everyone who came into my room: doctors, nurses, custodial staff, and visitors.

Now my trusty Yaesu is standard equipment in my diaper bag; along with the extra diapers, the disposable wash cloths, the baby powder, the rattles, toys, and pacifiers, I always tuck in my radio. I get some peculiar stares in the grocery store when Morse code or a man's voice emanates from its calico depths. I just smile and let them wonder.

The other amateurs in town are enjoying Jordan's progress, too. They hear my reports to Tom during the day—my anguish over her first shots, the minor triumphs of new tricks she has learned, the general joy of new parenthood. They tease us good-naturedly about it, but they are part of Jordan's extended family.

She is fascinated by the radio, too. She loves the interesting sounds it makes, particularly when Papa's voice comes out of it. She grins and pulls the antenna into her mouth. Considering her early start, we figure she will be the only kid in kindergarten carrying a handheld.

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CQ REVIEWS:

The AEA HR1
Half-Wave 2 Meter HT Antenna

BY DAVE INGRAM*, K4TWJ

If there's anything more plentiful and popular than 2 meter f.m. talkies, it surely must be antennas for 2 meter talkies. There are rubber duckies, stubby duckies, funky duckies, ducky duckies, quarter-wave pullups, and ⅝-wave gonzollas. We could all start quacking over this vast selection of radiators. You too have probably tried two or three of these antennas and pondered which was best for your needs. The ⅝-wave talkie whip exhibits a significant range improvement over a conventional rubber ducky, especially if you're working "direct" from some off-the-wall place or foot-stomping in the wilderness. The length of these antennas and their uncontrollability when snapped on a talkie, however, have been a disadvantage one has had to accept for the increased range and performance. AEA's new half-wave talkie whip, however, stands a good chance of changing that situation. Might this be the talkie antenna of your dreams? I'll tell you my own case history and let you decide for yourself.

A recent change of routines had the XYL, WB4OEE, and myself trying to communicate each midday via a difficult 2 meter direct path. While she used a 25 watt rig and Isopole antenna, I used an FT-208R talkie. Since my office was a maze of concrete and metal, a rubber-ducky antenna was useless. A ⅝-wave talkie whip antenna was tried, but it barely made my signal rise above noise level on the distant receiver. However, I did find at this point successful communications could be obtained when standing in the middle of a nearby street using the ⅝-wave whip. (Traffic isn't a serious problem in Alabama.) The original rubber ducky was still ineffective at that street location.

After going through a daily street-standing ritual for nearly two weeks, I began considering alternate possibilities (spontaneity isn't my greatest asset). Then a small package lacking any written information arrived from Advanced Electronics Applications, Inc., of Lynnwood, Washington. Inside was a pullup whip antenna, somewhat shorter than a ⅝-wave whip, noticeably thinner in design, with a red plastic cover over a bottom coil and a BNC connector.

Since it was near midday and raining horrendously (a nearby resident was constructing an ark), I moved to our building's front door and called WB4OEE via our difficult direct path. The XYL responded immediately, asking if I had finally conceded defeat and purchased a 25 watt amplifier (she had been suggesting I either get a mobile rig or give up this nonsense). Since I was now almost full quieting, I switched back to the rubber ducky. Nothing. I quickly tried the ⅝ wave. "Was that you? What happened to the amplifier?" Quickly switching back to the AEA whip antenna, I called again. "There you are," was the response. "Where did you go?" Impressive! The next day, incidentally, I tried the AEA whip from the midstreet QTH. My signal was then (and continues to be) almost full quieting from that test point. Will the antenna perform as well for you? Probably,

The AEA half-wave talkie whip getting a midday workout through both local and distant repeaters. Overall antenna length is 40 inches. Coil is not flexible.

but street standing in New York or Los Angeles isn't suggested.

I've now run a number of tests and evaluations of 2 meter talkie antennas, both direct and through repeaters. The results are summarized as follows. Rubber duckies and stubby duckies are acceptable if signal strength/distance coverage isn't critical. With their Lancelot appearance, ⅝-wave antennas significantly improve talkie range. The AEA ½-wave whip performs *at least* equal to a ⅝-wave whip (mine performs *better*!), and it's much easier to maneuver. Since acquiring the AEA whip, I've loaned the ⅝-wave whip to several curious amateurs. The AEA whip, however, isn't leaving my side.

Thinking logically about the situation of gain antennas used with 2 meter talkies, both ⅝-wave and ½-wave whips should provide roughly the same range and performance. The half-wave whip might perform slightly better than a ⅝ whip if its "missing half" is synthesized by the talkie's metal framework, but that situation may not exist on all talkies (some use all plastic cases rather than metal center sections, which can act as a counterpoise). Gain antennas, however, provide noticeably better results in a pinch, a point well worth considering if you operate portable to any extent. Considering the relatively low cost of these radiators, their use (if only occasionally) is worthwhile. Personally, I think the half-wave whip is tops!

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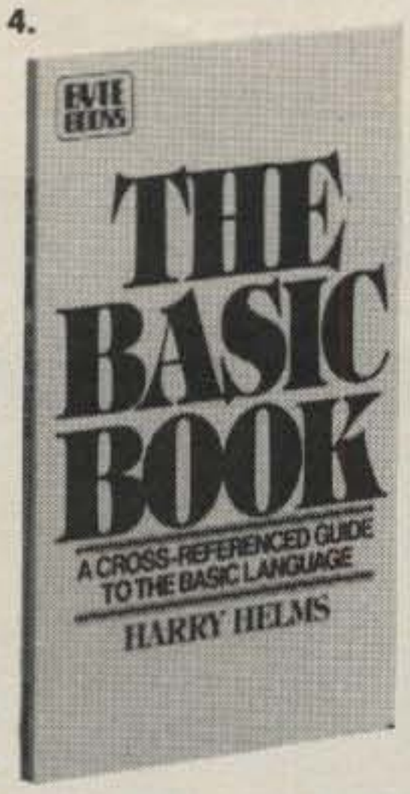

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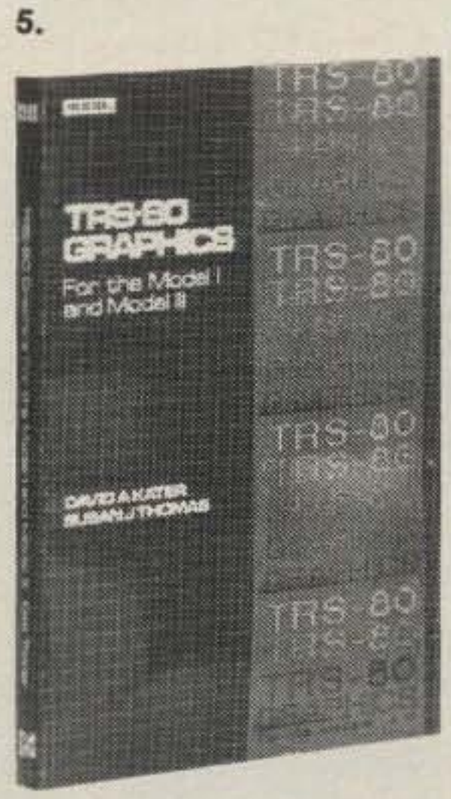

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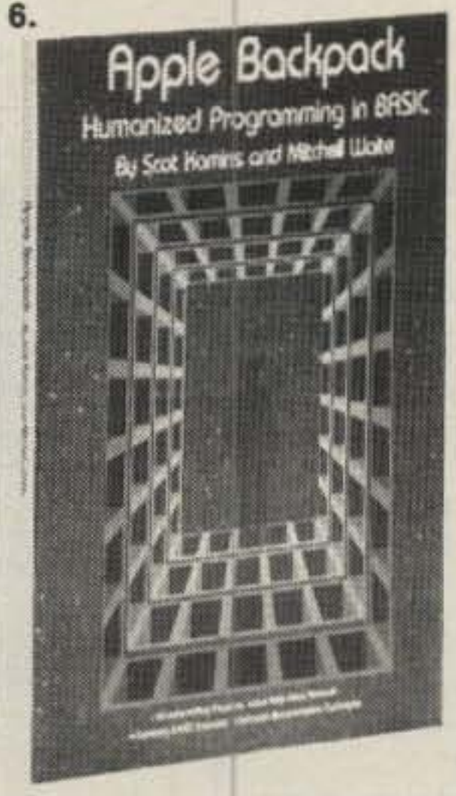

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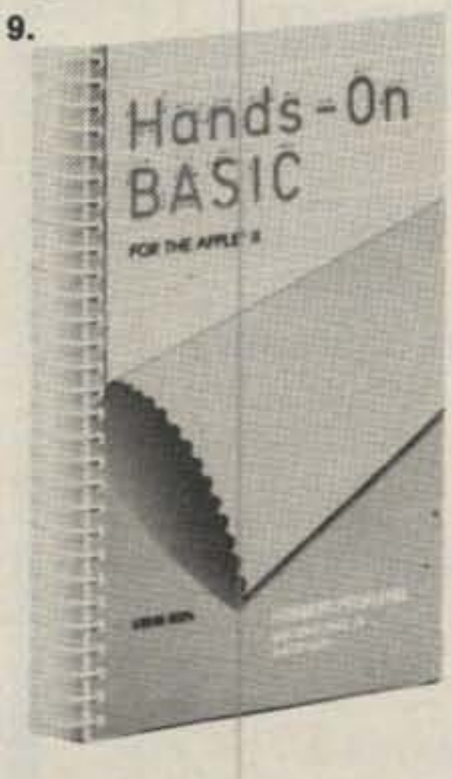

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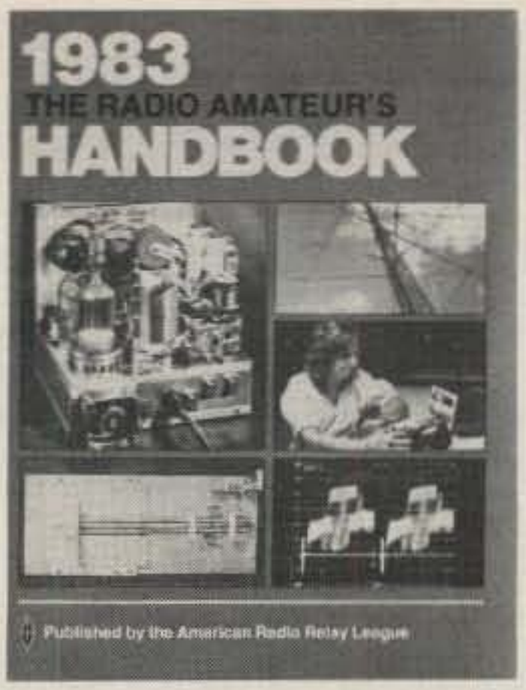

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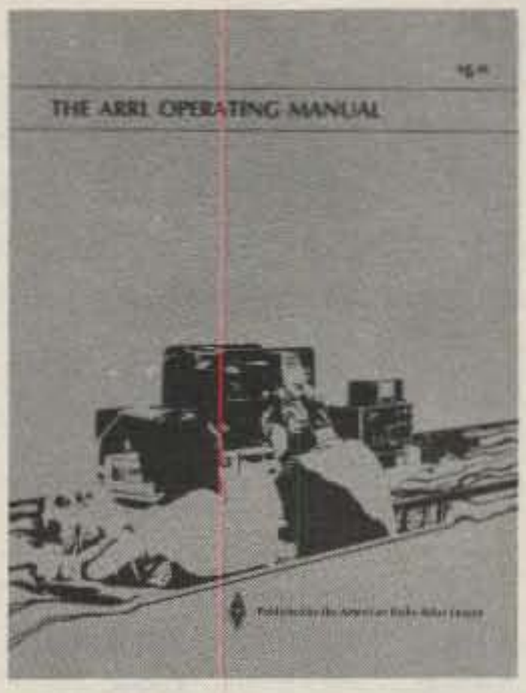

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No-67-68

Antennas

a monthly feature by
KARL T. THURBER, JR., W8FX

DESIGN, CONSTRUCTION, FACT, AND EVEN SOME FICTION

More Random Headings: Part III

Last month, your Antennas columnist did some "catching up" with reader mail, and also presented information on several new antenna and accessory products. This month, he continues in the same vein, and also strikes out in some new directions. —K2EEK

For the past several months, we have departed from the customary tutorial aspect of the Antennas column to publicly answer some reader mail, to highlight some new antenna and accessory products, and to tie up some loose ends from previous columns. This month, we will continue in this vein, and we will also make mention of a product not previously mentioned in the column: the personal computer. If we get slightly "off-track," we'll tie the discussion to antennas along the way.

Enter the Personal Computer

If 1982 was the year of the video game, surely 1983 looms large as the year of the personal computer. It would seem that practically everyone has had thoughts of purchasing a home computer, whether he or she actually needs one or not. Your columnist took the plunge this past winter, striking out at computer illiteracy with a shiny new VIC-20, with visions of performing various electronic and antenna-related calculations and possibly simple word processing on the new machine.

My experience was an interesting one, and I suspect that it is one that is shared by many readers. The Commodore VIC-20 looked like (and is) a good starter machine, one that is fairly powerful, versatile, and expandable, despite its exceptionally low price. Coming in at well under $200 by the end of 1982, the VIC was no higher in price than many sophisticated video games. On that basis it could almost be a "throw-away" if one's interest waned, or it could be given to a deserving kid next Christmas as a fancy game machine.

As it turned out, the VIC proved to be a "fun" machine with a variety of software programs and cartridges available for it. Soon, however, some of the limitations became apparent for serious technical and business uses. Foremost among these limitations were (1) the difficulty in running many programs when various memory expansion modules were installed (due to the unit's peculiar "floating" screen—a problem of its own); and (2) the 22-character-wide display, which makes complicated tabular work and word processing inconvenient at best. It wasn't long before I donated the VIC to my son (still reserving "game rights" in it), and plunked down hard cash for a Commodore 64. This powerful machine is basically a cross between a PET with lots of memory and an expanded VIC, but one also having very powerful color graphics and sound capabilities not possessed by its sibling.

Then came the confusion: which peripherals (disc drives, printers, etc.) would be compatible with both the VIC and 64; which programs could run on either or both; and which of the thousands of available PET programs could conveniently be adapted for either computer. This confusion on my part lingers as this is written, and the intercompatibility solutions aren't easy. To compound it all, I have had to go out and buy a computer desk to hold all the stuff.

I mention this tale because I think it's one that is common to many first-time computer buyers, who probably don't realize that the purchase of the "bare machine" is only the start of the adventure. Confusion, frustration, and sometimes disappointment may lurk down the road once one asks the machine to do more sophisticated work, and once one contemplates the purchase of various software packages and peripherals, many of which (as I found) are heavily advertised but just not available or even, in some cases, scarcely past the drawing board. These problems are fairly common when new and competing products are introduced in the marketplace, but what have been added are the increasing technological complexity of the equipment (which makes consumer evaluation difficult), the unavailability of detailed information for the purchaser, and the increasing speed at which various hardware and software changes take place.

Enough philosophizing. Once on the road to sorting out my installation, I noted several firms that sell amateur radio software for my computers and other popular computer systems. One line that I will mention here, since the line is fairly broad, was brought to my attention via Greg Yob's December 1982 "Personal Electronic Transactions" column in *Creative Computing* magazine. In this column, author Yob reviewed over 200 VIC-20 hardware and software products offered by some 55 manufacturers. In his review, he made mention of one program of special interest to me; it's called "Ham Antennas." This program is a fairly simple but convenient one that allows the antenna constructor to select from the program's menu a choice of ground plane, dipole, 3-element Yagi, and Delta loop antennas. In operation, the program asks

The Bird Thruline® RF Directional Wattmeter has been a classic for years. The flexible and portable instrument is designed to handle r.f. power levels from 100 mw to 10 kw over the range of 450 kHz to 2300 MHz. This exceptionally broad frequency and power-handling capability is achieved through the use of a large number of available plug-in elements. These elements read both forward and reflected power, as indicated by the direction in which the arrow is pointing; frequency range and full-scale power are marked on each element. The r.f. line section can be removed from the unit's case and inserted at any desired point in the transmission line for remote meter viewing. A wide variety of r.f. connectors are available. (Photo courtesy Bird Electronic Corporation)

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Say You Saw It In CQ

Most of it's black, but when assessing the merits of various types of coaxial cable, the resemblance stops there. The attenuation of r.f. energy by the transmission line can be dozens of times as great with one type of cable as with another. Losses are aggravated as the operating frequency is raised and as line s.w.r. increases. Refer to the text and figures for details.
(Photo courtesy Radio Shack)

for the design or operating frequency. It then calculates the required dimensions for construction, and provides further information regarding construction, feedpoint, and materials. It also produces a graphic drawing of the antenna with dimensions listed. The program is an inexpensive one ($5.95 at this writing, plus postage), and is available for the VIC-20, Commodore 64, Atari 800/400, and Sinclair ZX-81/Timex 1000. It is sold by RAK Electronics, P.O. Box 1585, Orange Park, FL 32067-1585. The same firm offers a variety of small amateur radio, electronic, business, finance, utility, and (of course) game programs on cassettes for these computers.

Although this has little connection with antennas, I'd like to share one "good deal" with readers who also own PET, VIC-20, or Commodore 64 computers. Also mentioned in the December *Creative Computing* magazine previously discussed was an 80-program collection of programs for the VIC-20, sold by Public Domain, 5025 S. Rangeline Rd., West Milton, OH 45383. This collection consists of "public domain" programs collected from various users' groups. While the programs are of widely varying quality, I found the collection (at $10 postpaid for either disk or cassette) to contain so many excellent games, demos, and utilities as to make the collection a "don't miss" bargain.

The firm has available at least one other VIC-20 collection, and for the most part, the various other programs are written in Commodore Basic, primarily intended for the PET. However, many (although by no means all) of the programs are compatible with the Commodore 64 and VIC-20. Besides the game and educational routines, many *CQ* readers will likely find the many technical, utility, and specialized programs of interest, and at the price, difficult to beat.

There are, of course, many software user group exchanges in existence which offer programs for the other popular personal computer systems. Such groups offer broad selections of public domain programs at rockbottom prices, and should not be overlooked in stocking a library of low-cost programs. Naturally, the quality of such software varies widely. One popular exchange with which I am familiar is the Toronto PET Users Group, 381 Lawrence Avenue West, Toronto, Ontario, Canada M5M1B9. The group has over 100 available diskettes in its collection, and publishes a monthly magazine, the *TORPET*.

There are literally tons of software to be had out there, a good deal of which is of interest to amateur radio operators. Some of this software is good, and some is hardly worth the effort to load and run. We'd like to hear from readers who would care to report their results with electronic calculation and especially antenna-related software that we can share with other readers.

Reader Mail Update

Questions involving standing wave ratio (s.w.r.) are frequently contained in letters to the Antennas column. Last fall, I received what is probably a representative inquiry from Emil F. Paur, W0mek, regarding s.w.r. relationships. He wrote:

"... I would like to know if you have any chart, graph, or table available showing the relationship between the percentage of forward power reflected and the s.w.r. For example, if I run 100 watts out and get 50 watts back (50% back as reflected power, I understand I'd have an s.w.r. of about 6. That's at 50% reflected power, but how about other percentages? I also understand that this is not a linear thing, and that by getting my reflected power down, in the above example to 5 watts, which is 10% of 50 watts, I would still have much more than 10% as high an s.w.r. I can't find any such charts in any of the handbooks I have, nor do I recall seeing anything like this in *CQ*. Any help would be appreciated."

No big problem here, as the mathematical relationships are well known, and they were clearly presented by Larry R. Houghton, K8ZVF, in the June 1970 *CQ*. In K8ZVF's article, "Convert S.W.R. Into Watts," he reflected on the problem with s.w.r. bridges presenting what has come to be thought of as a "dimensionless" ratio of impedance mismatch, and trying to cast this in terms of what is an "acceptable" s.w.r.

Recognizing the desirability of knowing how much power is reflected for a given s.w.r., Larry solved the equation for s.w.r. in terms of forward and reflected power (Pf and Pr). If this equation is solv-

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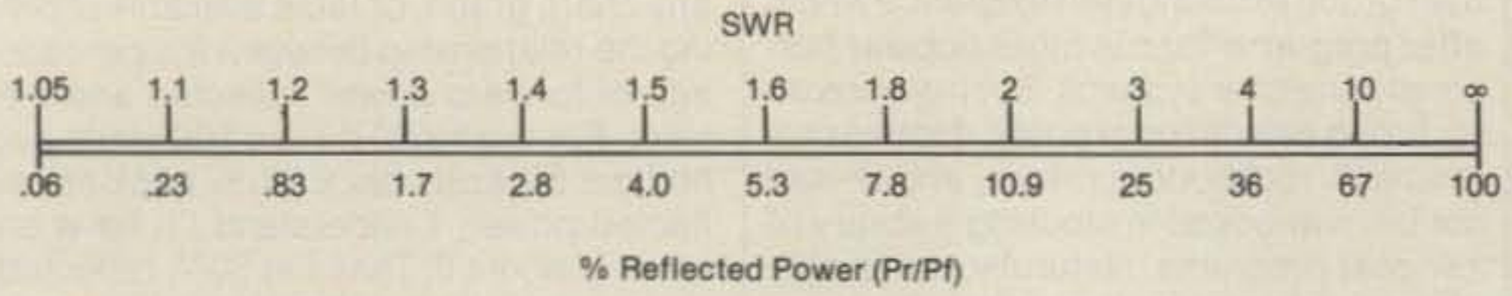

Fig. 1– Nomograph for converting s.w.r. into the % of reflected power. Note that for an s.w.r. of 3:1, 25.0% of the power into the transmission line is reflected. To determine the actual power in watts, move the decimal point two places to the left and multiply this by the forward power, Pf (e.g., if Pf = 100 watts, Pr = 0.25 × 100 = 25 watts).

ed for the ratio of Pr to Pf, or the percentage of reflected power, we get:

$$\% \text{ Reflected power} = \frac{Pr}{Pf} = \frac{SWR-1}{SWR+1}^2$$

From this equation, the percentage of reflected power can be found for any s.w.r. Multiplying the forward power by this number gives the amount of reflected power due to the impedance mismatch:

Reflected power = Pr
= (% reflected power) × (Pf)

Using this equation, various percentages of reflected power have been worked out for s.w.r.'s up to 10:1, and are presented in the nomograph of fig. 1, which was included in K8ZVF's 1970 article. For example, if you're putting out 100 watts, Pf, into a transmission line with an s.w.r. of 1.5:1, the percentage of reflected power, Pr, is 4%. Forward power multiplied by this percentage is: 100 watts × .040 = 4.0 watts, which some would consider to be a better indication of the power reflected than a dimensionless ratio.

The main requirement for performing such a calculation is to know the actual power going into the transmission line. A power meter in the line would show this. If one is not available, Pf can be estimated by knowing the d.c. power input to the final amplifier and its approximate efficiency (check the transmitter's published specifications). Of course, the practical need for these calculations largely has been reduced with the increased availability of inexpensive s.w.r. bridges and power meters that read both forward and reflected power directly without the need for further calculation. Look at the "r.f. instrumentation" in your own shack. What does the meter read: s.w.r. only, s.w.r. and percentage reflected power, forward and reflected power, or various combinations of these?

More on S.W.R.

Wait a minute, you say: the existence of reflected power does not necessarily mean that the power "reflected" is also "lost." Indeed, many multiband antennas, such as those making use of so-called tuned feeders, operate well with very high s.w.r.'s and do not show excessive r.f. losses. Most of these systems, however, make use of very low-loss feedline, such as open-wire or ladder line, which also shows relatively low loss even with high s.w.r. and thus, a high percentage of reflected power.

In the typical amateur station, however, coaxial cable is used for most r.f. plumbing. This type of cable shows relatively low loss, at least at moderate frequencies and with reasonable lengths, but losses increase considerably when a mismatch is encountered. Needless to say, losses should be minimized to ensure that the best possible system operation is attained, and this means reducing the losses caused by the reflection of power back toward the transmitter, in other words, by minimizing s.w.r. Losses are minimized by ensuring that the impedance characteristics of the transmitter, transmission line, connectors, and antenna itself are closely matched.

Defining just what s.w.r. presents an "acceptable" level is risky, but generally a value of less than 3:1 is acceptable for good system performance. The 3:1 figure is also a good ballpark figure in terms of the maximum s.w.r. that many solid state transmitters will tolerate without having the final amplifier protection devices kick in to either cut off transmission or reduce power significantly.

The left-hand chart in fig. 2 shows typical line loss for perfectly matched popular transmission lines; the attenuation in dB per 100 ft. of cable is shown at various frequencies, from 10 to 1000 MHz. Note the dramatic reduction in line losses at v.h.f. and u.h.f. frequencies when rather expensive hardline is used.

Additional losses are created when there is an impedance mismatch between the antenna and the transmission line. The right-hand chart in fig. 2 shows these additional losses and can, in effect, be used to estimate the additional degradation in antenna system efficiency created by standing waves in the system. For an example of how to use the chart, if the line loss of the system is 3 dB (select from the horizontal coordinate) and the s.w.r. is 2:1 (select the s.w.r. = 2 plot), this 3 dB line loss, when coupled with an s.w.r. of 2:1, results in an additional loss of 0.38 dB. Thus, the total antenna system loss is 3.38 dB. As can be seen, high s.w.r.'s on relatively high-loss coax such as RG-58/U, operated on v.h.f. or u.h.f. frequencies, can result in truly catastrophic signal losses, which can be aggravated by the use of incorrect or improperly installed r.f. connectors.

New S.W.R. Meter

We've already mentioned the importance of minimizing s.w.r. in coaxial systems; most amateurs realize the importance of doing so. What have been lack-

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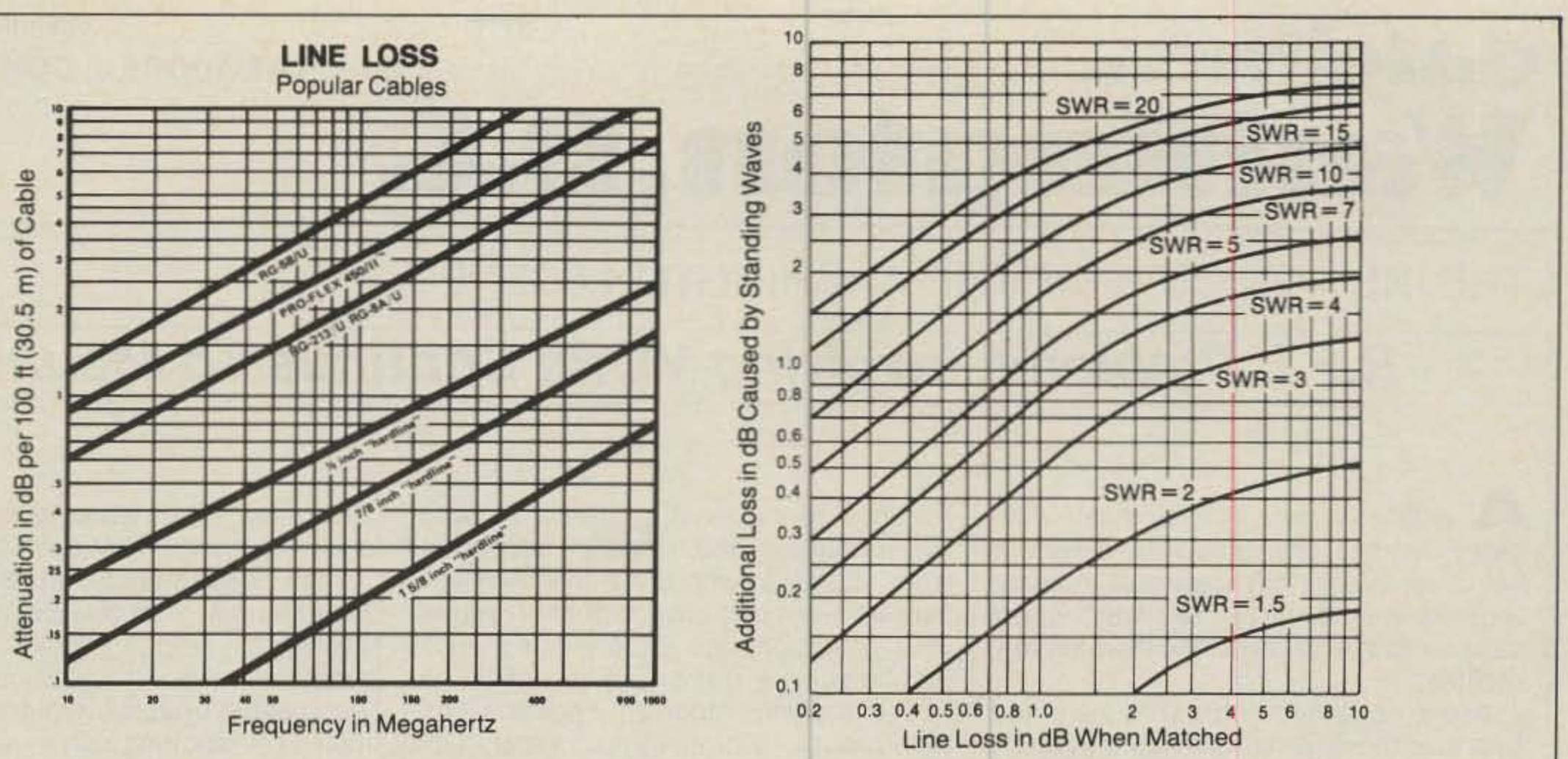


Fig. 2– Transmission line losses. Source: Professional Communications Catalog ASP-1005, 9/82, Antenna Specialists Co.

Quick and accurate forward and reflected power readings are possible with high-quality units such as the Daiwa CN630, shown here, even at v.h.f. and u.h.f. Unit features a unique two-scale meter that enables simultaneous, direct-reading s.w.r., forward power, and reflected power measurements. The 50 ohm device handles up to 200 watts r.f. over the range 140–450 MHz. (Photo courtesy J.W. Miller, importers)

ing, up until recently, are convenient meters that allow the operator to easily and positively visualize what is happening to forward and reflected power as adjustments are made to the antenna system or antenna tuner.

A giant step was taken with the introduction of the Daiwa series of power/s.w.r. meters, which allow simultaneous display of forward power, reflected power, and s.w.r. With these and similar types of "dual reading" instruments, it was relatively simple to see the interrelated effects of, say, antenna-coupler tuning on the three measurements.

A more recent innovation has been the automatically computing light-bar s.w.r. meter, an example of which is the Palomar Engineers M-827 s.w.r. meter. In this device, the meter computes s.w.r. automatically and displays it on a 2-inch long, bright red display light bar. The old "sensitivity" knob has been eliminated, and the s.w.r. reading is correct regardless of power level. The "power" light bar displays forward power, and unlike the analog meter which it replaces, follows instantly to respond to s.s.b. voice peaks. The second light bar displays s.w.r.; the scale is 1 to 10, with a logarithmic response that provides good resolution in the lower s.w.r. range, where it is most needed. The instrument's power ranges are switch selectable at 20, 200, and 2000 watts, while usable frequency range is 1.7–30 MHz.

In practical use, the transmitter is turned on, preferably in the tune mode. Both power level and s.w.r. are displayed on the light bar; if using an antenna tuner, it should be adjusted for minimum s.w.r. I found the light bar to be very sensitive near 1.0:1 s.w.r., so that very minor adjustments to the antenna system or antenna tuner caused a very noticeable meter reading change; this is normal, and is explained in the unit's instructions. The instructions also point out that when the s.w.r. is at 1:1, the power meter reads correctly, but if the s.w.r. is above 1:1, indicated power readings will be high.

Reflected power is not indicated directly on the Palomar meter. However, if one is interested in knowing the reflected power, the nomograph in fig. 1 may be used for the purpose.

Wrapping It Up

In this month's "Random Headings" series we have sidestepped to discuss the personal computer in antenna applications, taken a look at some reader mail relating to s.w.r., and made mention of a new direct-reading s.w.r. meter. Next month we will examine several other topics of timely interest. See you then.

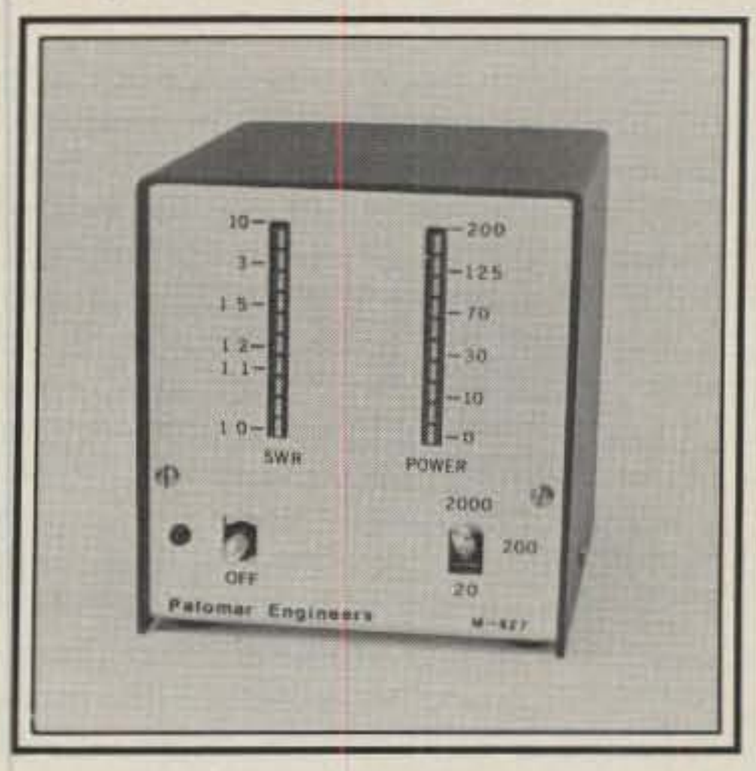
73, Karl, W8FX

Bibliography

Houghton, Larry R., K8ZVF. "Convert S.W.R. Into Watts," *CQ*, June 1970.

Professional Communications Catalog ASP-1005 9/82, Antenna Specialists Company, 1982.

Yob, Greg, "Personal Electronic Transactions" column, *Creative Computing*, December 1982.



Not bearing much resemblance to conventional s.w.r. meters is the M-827 by Palomar Engineers. This device automatically computes s.w.r. and displays it on a vertically-oriented light bar. The calibration or "sensitivity" knob has been replaced, so s.w.r. readings are correct, regardless of power level, and the light bar follows even s.s.b. voice peaks instantly. A second light bar displays forward power. Both are bright red and 2 inches long. The M-827's frequency range is 1–30 MHz; power ranges are 20, 200, and 2000 watts. The s.w.r. scale reads from 1 to 10 with a logarithmic response with enhanced resolution at lower s.w.r. levels. The unit is 4" × 4" × 5" with a brushed aluminum control panel and baton switches. Price is about $100. (Photo courtesy Palomar Engineers)

dateline... Washington, D.C.

a regular feature by
THEODORE J. COHEN, N4XX

THE INS AND OUTS OF THE WASHINGTON SCENE

R.F.I. Problems Involving VCRs Continue To Mount

A reliable source in Washington indicates that r.f.i. problems with VCRs are not unusual, and that electronic industry representatives have received many calls on this problem during the past few months.

In one case involving a VCR marketed by a well-known American manufacturer, an industry spokesperson suggested that the amateur involved contact the manufacturer. But the industry spokesman is also alleged to have added that if the problem could not be solved, *quiet hours* could be imposed on the amateur!

In a telephone conversation with the amateur, a representative of the American manufacturer is said to have stated that the problem probably involved the color-burst crystal, that it was a design problem, and that it could not be fixed easily in the field.

If you are experiencing problems with r.f.i. to a VCR, notify the FCC immediately: Federal Communications Commission, Field Operations Bureau, Enforcement Division, 1919 M St., NW, Washington, D.C. 20554. Copies of your letter should also be sent to the manufacturer of the VCR and to the ARRL (Attn.: RFI Task Group). It is only through your reports of r.f.i. concerning VCRs and other electronic home-entertainment devices that both the FCC and the Congress can determine what steps should be taken under Public Law 97-256 to require that manufacturers produce equipment that is not susceptible to strong r.f. fields. Under this law, the FCC now has the authority to impose susceptibility standards, but the Commission and the Congress favor voluntary standards. Judging from the incident reviewed above, it would appear that the consumer electronics industry is still intent on making amateurs their whipping boy, something Senator Goldwater, Chairman of the Senate's Subcommittee on Communications, should find most interesting!

Consumer Electronic Devices Cause Rash of R.F.I. Problems

Problems with touch-controlled lamps produced by a number of manufacturers continue to cause interference to both the broadcast and amateur bands. In some cases, keying the transmitter will cause the lamp to turn on or off. If you or your neighbors are experiencing such problems, you are urged to notify the FCC; send your report to: Federal Communications Commission, Field Operations Bureau, Enforcement Division, 1919 M St., NW, Washington, D.C. 20554.

Also found to cause radio-frequency interference are wall switches that are sound-activated. These so-called "whistle-up switches" apparently cause noise to be transmitted throughout a home's electrical system, something which, in some cases, may be cured by installing a line filter in your receiver's a.c. line. Again, notify the FCC immediately if you experience such problems.

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ARRL Files Comments on Senate Bill S-66 Re Cable Television

The ARRL has filed comments with the Senate Subcommittee on Communications, Committee on Commerce, Science, and Transportation, in the matter of S-66. The bill, which deals with cable television and the provision of cable television service to the public, was introduced by Senator Baker for Senator Goldwater, who heads the Subcommittee. The League's particular concern is the large number of incidents of radio-frequency interference caused by cable television signal leakage (CATVI). Such leakage not only affects the Amateur service, noted League Counsel Christopher D. Imlay, but it can disrupt the operations of other public-safety radio services, as well. In addition, consumers of cable television services are often subject to interference when signals from other services leak into the cable system.

Imlay acknowledged that the Commission's Rules do impose maximum permissible field-strength limits for cable signal leakage. But he noted that studies by the League suggest that most systems operating in the U.S. display excessive levels of r.f. radiation in violation of these limits. Further, Imlay stated that "there is no rule . . . which requires a cable system to remedy interference suffered by its own subscribers when those consumers' cable drops receive amateur signals due to its inability to reject such signals."

The League concluded its comments by saying that "the only practical way to resolve this unique problem is to eliminate the inherent incompatibility (between cable systems and amateur operations) by requiring cable companies to utilize frequencies other than those allocated to the Amateur service.

FCC Expands U.S. Amateur Phone Privileges in the 20 Meter Band

By the time you read this, amateur phone allocations in the 20 meter band will be as follows:

Extra Class	14,150–14,350 kHz
Advanced Class	14,175–14,350 kHz
General Class	14,225–14,350 kHz

The new allocations, adopted at the Commission's Open Agenda meeting of 31 March 1983, represent a First Report and Order in Private Radio Docket 82-83. At the same meeting, the Commission adopted a Further Notice of Proposed Rulemaking (NPRM) which seeks the public's comments on the following proposals for expansion of the amateur phone bands:

75 Meters:

Extra Class	3750–4000 kHz
Advanced Class	3775–4000 kHz
General Class	3850–4000 kHz

40 Meters (Hawaii only):

Extra & Advanced 7075–7100 kHz

15 Meters:

Extra Class	21,200–21,450 kHz
Advanced Class	21,225–21,450 kHz
General Class	21,300–21,450 kHz

10 Meters:

All classes	28,300–29,700 kHz

While firm dates for when comments and reply comments are due were not available at presstime, likely dates are 1 July and 1 August, 1983, respectively.

Amateurs Show Way to Stop CATVI Before It Becomes a Problem

When a new cable television company requested a franchise to operate in the

Say You Saw It In CQ

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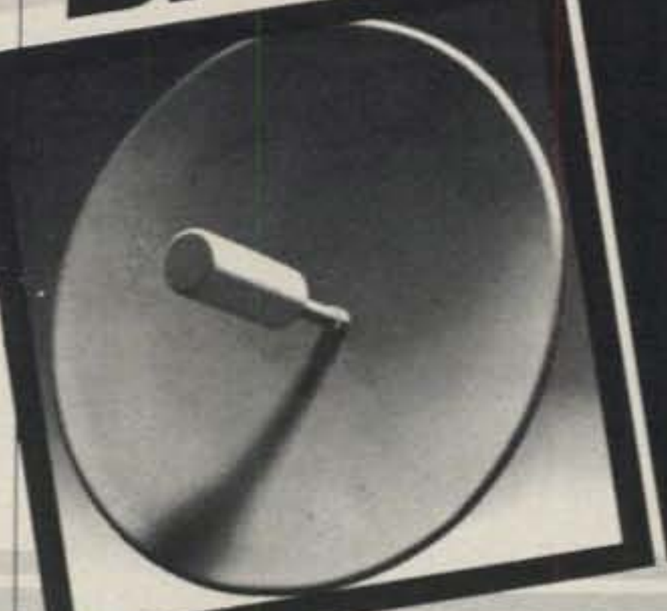

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The Saturn-15 XHP comes complete with a 30 inch precision tuned receiving dish, advance design downconverter, power tuner, 60 feet coaxial cable, necessary adapters, mounting hardware, and installation instructions. A six month parts and service warranty covers the Saturn-15 XHP.

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city of Monroe, MI, a public meeting was held by the Mayor and City Council.

David Smith, W8YZ, President of the Monroe County Radio Communications Association, and V. Olimpio Varsogea, WB8SEZ, the city's member of the County Communications Committee and the county's Emergency Coordinator, spoke about possible harmful interference from cable TV systems to various communication services. Smith and Varsogea then asked that prohibitions against any such interference be included specifically in the cable TV franchise approved by the City of Monroe.

A franchise agreement was subsequently approved for Monroe, and included is a special section concerning "Operational Interference," which states in part:

"... and no interference shall result from Grantee's (company's) operation to any type of electronic communications equipment now in use. Any such interference shall be eliminated within a reasonable time after notice thereof.

"Time is of the essence. Grantee shall not be relieved of any obligation to comply promptly with any of the provisions of this Agreement."

If cable TV operations are contemplated in your area, the experience of amateurs in Monroe, MI, suggests that the time to address the CATVI problem is at the time that your local government is negotiating a contract with the cable TV operator.

FCC Takes Action on Ten-Year License Period For Amateurs

At the Commission's Open Agenda meeting on 31 March 1983, the FCC released an NPRM (PR Docket 83-337) which seeks the public's comments on a proposal to extend the term of both the amateur station and operator licenses to ten years. It was also proposed to extend the grace period for renewing both types of licenses to two years. Currently, amateur licenses are issued for a period of five years, with the grace period for the station and operator licenses being one and five years, respectively.

National Communications System Considers Memorandum of Understanding with ARRL

According to "The ARRL Newsletter," a bi-weekly publication for League members only, the National Communications System, (NCS) operated by the Defense Communications Agency, is now considering a Memorandum of Understanding (MOU) which could be signed with the ARRL on behalf of amateur operators. Consideration of the MOU stems from the NCS's concern for reconstituting vital communication links following an attack on this country, and its recognition that amateurs represent a large, well-distributed, skilled group of communication specialists having excellent h.f. capabilities.

Some administrative problems would have to be solved before amateurs could work with the NCS under the conditions envisioned. For example, Title 47 of the Code of Federal Regulations (Part 201-215) requires amateurs (except those enrolled in RACES) to shut down immediately when the President's War Emergency powers are invoked.

Initial communication drills involving the Air Force's Strategic Air Command (SAC) proved that amateurs could be helpful in a post-attack situation. Drills of a similar nature are now being planned as consideration of the draft MOU continues by both the NCS and the ARRL.

California Amateur's Station License Revoked; Operator License Suspended

The FCC Review Board has revoked the license of Henry C. Armstrong III, of Slymar, CA, for amateur radio station WA6CGI and suspended for the remainder of its term his Advanced Class operator license. This action was taken because of numerous violations of the FCC's Amateur Rules, including:

- willful or malicious interference with radio communications and signals
- transmissions not directed to any receiving apparatus nor to other amateur stations
- transmission of one-way communications
- broadcasting.

FCC Administrative Law Judge Thomas B. Fitzpatrick, in an initial decision last fall, found that Armstrong deliberately interfered with transmissions to and from a repeater station operated by the Southern California DX Club. The Review Board adopted the findings and affirmed the Judge's actions.

The Board noted that FCC engineers heard Armstrong continuously transmit a computer voice-synthesized audio signal that included his call sign, a statement that the station was under computer control, the frequency, and the amount of time the station had been on the air. While Armstrong acknowledged that the transmissions were his, he argued at the hearing that he was conducting permissible experimental testing related to the development of a computer program to conduct amateur communications.

The Board noted, however, that when Armstrong was notified that he was interfering with other amateur communications, he made no attempt to correct the situation. Rather, he continued to deliberately monopolize the repeater frequency for prolonged periods of time. As such, the Board felt that the record warrants no lesser sanctions than those applied by the Administrative Law Judge.

"FCC Rule Book" an Instant Hit

The ARRL's latest publication, *The FCC Rule Book: A Guide to the FCC Reg-*

ulations, is on the street! Written by Richard K. Palm, K1CE, the ARRL's Assistant Manager for Membership Services and the writer of *QST*'s "Washington Mailbox" column, the book has already won rave reviews in Washington.

The volume, which is 156 pages long, contains a current edition of Part 97 of the Commission's Rules as well as easy-to-read "Washington Mailbox" interpretations of the regulations which govern our operations. Covering everything from the frequencies that are authorized for our use to the latest regulations on digital codes and space operation, *The FCC Rule Book* is a "must" for every active amateur attempting to catch up on the ever-changing regulatory scene in Washington. Copies of the book may be obtained from the ARRL or from your local amateur outlet.

Arthur S. Westneat, W1AM, Receives IEEE Award

Arthur S. Westneat, W1AM, has received the IEEE Oceanic Engineering Society Distinguished Service Award for 1982. Mr. Westneat is currently a consultant in electronic systems development and is associated with the University of New Hampshire as a Senior Research Fellow. According to the IEEE Oceanic Engineering Society newsletter, he was selected for the award in recognition of his "outstanding and dedicated service to the aims of the Society, his prominence in the field, and his energetic and effective leadership since the early days of the IEEE Oceanography Coordinating Committee."

The staff of *CQ* magazine joins your Washington Editor in extending our congratulations to Mr. Westneat on his receipt of this prestigious award.

AMSAT Hires General Manager

According to "Amateur Satellite Report" (ASR), AMSAT's newsletter for the Amateur Space Program, AMSAT has selected William L. Lazzaro, N2CF, of New York to be its new General Manager and Executive Director.

Bill is in his early thirties, is married, and has three boys. The holder of an Amateur Extra Class license, he was first licensed in 1964 and has worked with OSCAR satellites since 1978. He holds a BS cum laude and a Masters Degree in Science Education, and is working on his doctorate degree.

In an interview with ASR, Bill sees one of his primary functions as being responsible for winning grants for AMSAT to finance the Corporation's ongoing programs in space awareness and amateur satellite work. He's also very excited about PACSAT, a satellite program sponsored by Volunteers in Technical Assistance *(see May CQ for an interview with VITA's key personnel — ed.)*, for he believes it will influence amateur radio's future as much as, if not more than, the Phase IIIB satellite program.

The entire staff of *CQ* magazine joins your Washington Editor in extending our congratulations and best wishes to William L. Lazzaro on his appointment as General Manager and Executive Director of AMSAT.

Attention Amateurs With Atari Computers!

If you are interested in computer applications to amateur radio, the Atari Microcomputer Network may be for you. According to Jack McKirgan II, WD8BNG, over 250 currently belong to the Net, and new members are always welcome. The Atari Microcomputer Network meets weekly, and each member receives the Net's bimonthly journal, "Ad Astra . . . ." The journal, by the way, will appeal to hams and hardware buffs.

If you're interested in joining, contact: The Atari Microcomputer Network, Jack McKirgan II, WD8BNG, 4749 S.R 207 N.E., Washington C.H., OH 43160; phone (614) 869-3597.

Commission Adopts NOI and NPRM on Re-examination of Technical Regulations

Earlier this year, the FCC adopted and released an NOI and NPRM (General Docket 83-114) to examine certain of the Commission's technical regulations. The ultimate intent of the proceedings is to eliminate those regulations that no longer serve useful purposes, replacing those which are overly burdensome with less constraining regulations. In no case is the intent to undermine the Commission's responsibilities under the Communications Act of 1934.

The NPRM, in particular, proposes to eliminate some specific technical regulations which the Commission feels are no longer needed. By technical regulations it refers to rules of an engineering/technical nature which limit or otherwise govern the public's use of the radio frequency spectrum; also to be addressed are the electrical characteristics of radio and other electronic equipment (and systems) under the FCC's jurisdiction. Some of the regulations on which the Commission seeks comments pertain to Part 97 (the Amateur service), and involve areas such as authorized frequencies and emissions, emission limitations, and maximum authorized power.

Comments were due on 2 May 1983. Reply comments must be received before 1 June 1983.

High-Tech Corporations Plan Staff Increases in 1983

As noted in the April 1983 issue of the IEEE's *Spectrum* magazine, "an employment and salary survey of 1102 high-technology corporations throughout the

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CIRCLE 28 ON READER SERVICE CARD

nation showed a great deal of optimism for 1983 engineer hiring."

The survey, which had been conducted by Robert & Roman, Inc., of Fort Lee, NJ, showed almost 70% of the firms responding planned to hire at least one engineer in 1983, while over 50% said they thought they would hire four or more engineers. Indications were that competition for engineers would be most intense in New England and Washington, D.C., while little demand would exist in the Pacific Coast region. Especially in demand, according to Robert & Roman, will be engineers with three to five years of experience.

The survey also found that the median salary paid in 1982 for an engineer with a B.S. and one year of experience was $24,788, while engineers with a B.S. and three to five years of experience commanded $29,697. The median salary for an engineer with a B.S. and 10 years of experience, however, was $36,412. Engineers with advanced degrees were paid, on the average, 11% more than those with B.S. degrees only.

Commission Issues NPRM on Additional Interim Frequencies for Cordless Telephones

In General Docket 83-325, the Commission has proposed providing additional interim frequencies in the 46 and 49 MHz bands (currently assigned for government use) for cordless telephone operations. The proposal responds to petitions requesting additional frequencies for cordless telephones from the Electronic Industries Association and Mura Corp. In proposing the new frequencies, the Commission noted that because of the growing consumer demand for cordless telephones, the small number of channels permitted under the present rules were inadequate to avoid congestion and interference. And while the FCC is considering a new personal radio service in the 900 MHz region which may, in part, accommodate cordless phones, a solution to the spectrum-crowding problem was needed now.

Under the NPRM, the Commission is proposing to allow manufacturing and importing of cordless telephones on an interim basis for five years. The phones would use 10 duplex channels in the 46.6–47.0 MHz and 49.6–50.0 MHz bands. Marketing would terminate one year later, but devices could be operated for their full lifetime once purchased.

The transition to the new frequencies (46 and 49 MHz bands) is not anticipated to have detrimental effects on cordless telephones presently operating in the 1625–1800 kHz band. While the manufacture of current-generation equipment would eventually be discontinued, use of these cordless phones could continue for the lifetime of the equipment. The old and new generation phones will perform in similar fashion as far as the user is concerned.

For additional information on this matter, contact Art Wall at (202) 653-8247.

FCC Commissioner Anne Jones Resigns

In April, FCC Commissioner Anne Jones announced that she would resign from the FCC by 31 May 1983. It was Ms. Jones's intent to return to the private sector, ending 15 years of service to the government. At the time of her resignation, however, Ms. Jones indicated that she had no plans to join a specific company.

At this time, FCC Chairman Mark Fowler is undecided on whom he will recommend to fill Ms. Jones's term, which won't expire until 1985.

Commission Now Authorized to Suspend Licenses of Commercial Radio Operators Who Assist Illegal Communications Operations

The FCC is now authorized to suspend the licenses of those commercial radio operators who advise, equip, or otherwise assist illegal communications operations.

Specifically, an amendment to Section 303 of the Communications Act authorizes the FCC to suspend the license of any radio operator who has "caused, sided, or abetted the violation of any Act, treaty, or convention binding on the United States, which the Commission is authorized to administer, or any regulation made by the Commission under any such Act, treaty, or convention; . . ."

Your CQ Washington Editor thanks Messrs. Sid Bradfield (Office of Science and Technology), John Johnston (Private Radio Bureau), Richard Vaughan (Regional Director, San Francisco), and Dr. Michael Marcus (Office of Science and Technology), all of the FCC, for their contributions to this month's column.

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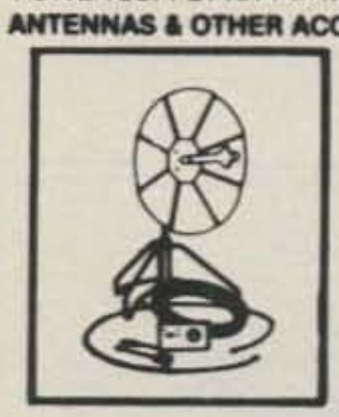

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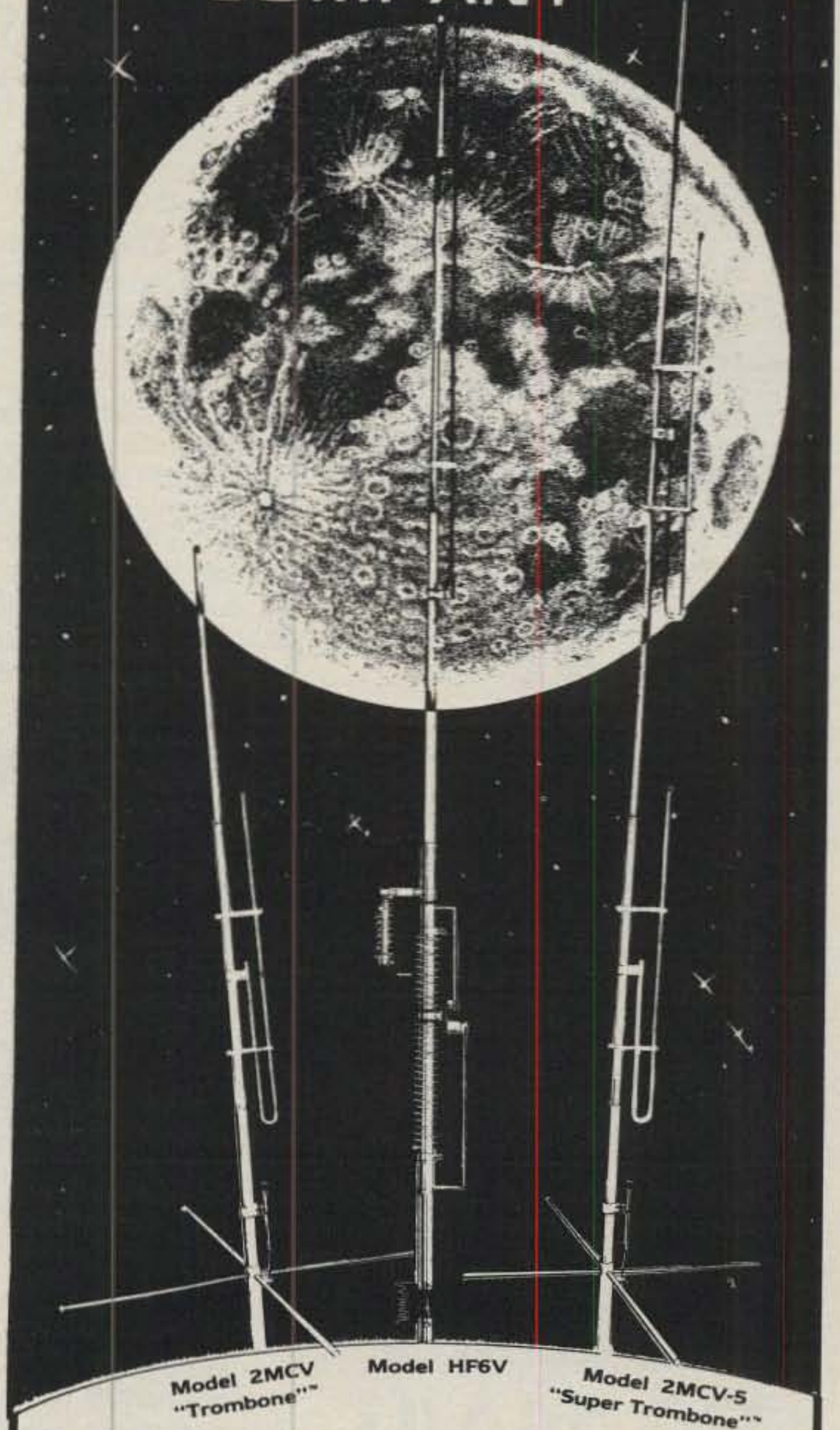

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CQ SHOWCASE

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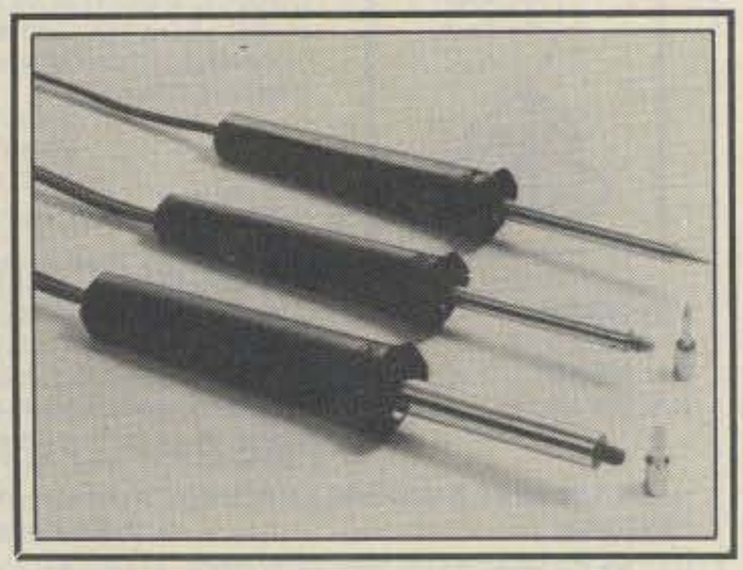
Yaesu Electronics Corp. has announced the availability of the FT-726R, an h.f./v.h.f./u.h.f. transceiver capable of full duplex operation for satellite work. The basic FT-726R comes equipped for 2 meter operation on s.s.b., c.w., and f.m. Optional units may then be plugged in, enabling operation on 10 or 6 meters, 430–440 or 440–450 MHz on 70 cm. The optional SU-726 Satellite Unit allows crossband full duplex operation for simultaneous uplink transmit and downlink receive operation on amateur satellites.

The FT-726R features a dual v.f.o. plus memory frequency management system, with independent frequency/mode storage on each v.f.o. or memory. The transmit and receive frequencies may be varied during satellite work, to allow zero-beat capability while following Doppler Shift. The unit includes an s.s.b. speech processor, i.f. shift, variable i.f. bandwidth tuning, i.f. noise blanker, R.I.T., multimode squelch, and a receiver audio tone control. A c.w. filter, DTMF encoding microphone (YM-48), desk microphone (MD-1B8), external speaker (SP-102), and CTCSS units are available as options. For more information, contact Yaesu Electronics Corp., P.O. Box 49, Paramount, CA 90723, or circle number 101 on the reader service card.

Ungar Solding Irons

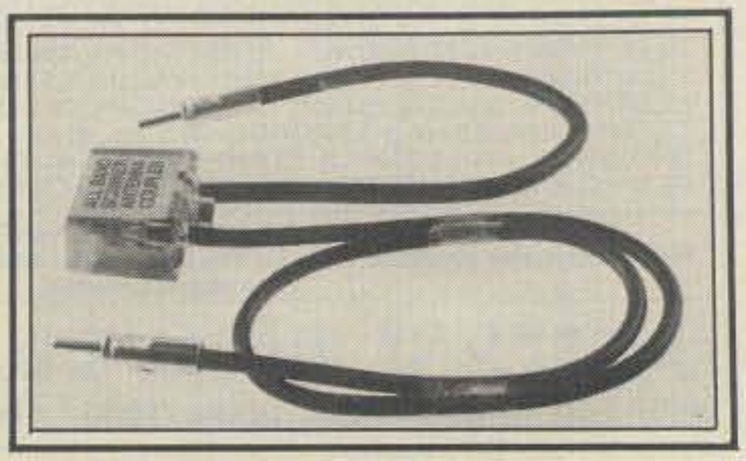
Three new low-priced "consumer" soldering irons with advanced "Thermo-Duric" heaters have been introduced by the Ungar Division of Eldon Industries, Inc. "Thermo-Duric" heating elements reach soldering temperature faster, use less energy, last longer, and take up less space than earlier wire-wound heating elements. Since the heaters were developed for industrial soldering systems, the new "consumer" line has soldering qualities appropriate for electronic technicians, hobbyists, and do-it-yourselfers.



The CM-25 ($8.50) has an integral nickel-plated cone tip suitable for small and large connections. The 25-watt iron heats to 750 °F. The 45-watt CM-45 and 80-watt CM-80 can use any of 11 standard Ungar screw-on tips, and have three-wire cords to prevent leakage current damage. The CM-45 ($11.25) comes with an iron-plated pencil-tip point. Operating temperature is 700 °F. The large-capacity CM-80 ($17.50) comes with an iron-plated chisel tip and operates at 800 °F. For more information, contact Ungar, 100 W. Manville St., Compton, CA 90220. In Canada: Eldon Industries of Canada, Inc., 500 Esna Park Dr., Markham, Ont. L3R 1H5, or circle number 102 on the reader service card.

A/S Electronic Coupler

This tiny electronic coupler, designated model MON-63, interconnects with a split coaxial cable between the existing a.m./f.m. standard broadcast antenna, the car radio, and the scanner, remaining hidden behind the dash board and requiring no physical installation or power connection. According to the manufacturer, the result is performance substantially superior to the conventional whip provided with all scanners, but does not degrade performance of the broadcast antenna either on a.m. or f.m. MON-63 is furnished complete with all necessary cable and connectors. Suggested price is $15.95. For further information, contact The Antenna Specialists Co., 12435 Euclid Avenue, Cleveland, OH 44106, or circle number 103 on the reader service card.



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MRF421	27.00	MRF421-2	58.00
MRF450	12.50	MRF450-2	28.00
MRF453	15.00	MRF453-2	33.00
MRF453A	15.00	MRF453A-2	33.00
MRF454	16.50	MRF454-2	36.00
MRF454A	17.00	MRF454A-2	37.00
MRF455	14.00	MRF455-2	31.00
MRF455A	13.50	MRF455A-2	30.00
MRF458	18.00	MRF458-2	39.00
MRF492	20.00	MRF492-2	43.00

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VHF & UHF TRANSISTORS

Type	Mount	Rating	MHz	Net/ea.
MRF238	(s)	30W	145-175	13.00
MRF240	(s)	40W	145-175	15.00
MRF245	(F)	80W	130-175	27.00
MRF247	(F)	80W	130-175	27.00
MRF492	(F)	70W	27-50	20.00
SD1416	(F)	80W	130-175	30.00
SD1477	(F)	125W	130-175	37.00
SD1441	(F)	150W	130-175	83.50
2N6081	(s)	15W	130-175	7.75
2N6082	(s)	25W	130-175	9.75
2N6083	(s)	30W	130-175	9.75
2N6084	(s)	40W	130-175	13.50
MRF644	(F)	25W	430-470	21.50
MRF646	(F)	45W	430-470	24.50
MRF648	(F)	60W	430-470	33.50

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TH5Mk2S 5 element triband --- 309.00
TH3Mk3S 3 element triband --- 215.00
TH3JrS 3 element triband --- 156.00
18AVT 5 band trap vertical - 87.50
14AVQ 4 band trap vertical - 51.00
V2S 2 meter colinear ------- 38.00

Hy-Gain Crank-up Towers

HG-50MT2 50' side supported - 754.00
HG-52SS 52' self-supporting - 923.00

Hustler

5BTV 5 band trap vertical -- 100.00
G7-144 2 meter colinear ----- 99.00
MO-1,MO-2 HF mobile masts --- 18.50
RM-10,RM-15 HF resonators --- 9.00
RM-20 HF resonator ---------- 12.00
RM-40 HF resonator ---------- 13.00
RM-75,80 HF resonators ------ 14.75

Rohn Towers

25G 10' stacking section --- 41.00
25AG2,3,4 top sections ------ 53.50
45G 10' stacking sections -- 93.75
45AG2,3,4 top sections ------ 104.75
HDBX48 48' self-supporting - 316.00
FK2548 48' foldover -------- 794.00

Diawa

CS-201 2 way coax switch ---- 20.00
CS-401 4 way coax switch ---- 62.00
CN-520 HF SWR/Power meter --- 59.00
CN-620B HF/VHF SWR/Power ---- 107.00
CN-720B HF/VHF SWR/Power ---- 150.00

Mini-Products

HQ-1 Mini-Quad 6,10,15,20 m - 129.95

Cushcraft

A4 4 element triband beam -- 224.50
A3 3 element triband beam -- 172.50
R3 Gain triband vertical --- 224.50
AV5 5 band trap vertical ---- 88.50
AV4 4 band trap vertical ---- 81.50
214B,FB 14 element 2m beam -- 68.00
A147-11 11 element 2m beam -- 37.50

Rotors

T2X "Tailtwister" 20 sq ft -- 244.00
HAM-IV 15/7.5 sq ft -------- 195.00
CD-45II 8.5/5 sq ft -------- 102.75
HD-73 Dual speed 10.7 sq ft - 89.00
U-100 Approx. 3 sq ft ------- 42.00

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MFJ-900 200 W Versa Tuner --- 41.95
MFJ-941C 300 W Versa Tuner -- 77.55
MFJ-949B 300 W Versa Tuner -- 117.55

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RG-213/u Milspec 95% shield - .28/ft
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RG-8U foam, 95% braid	23.5¢/ft
RG-8X foam, 95% braid	11.5¢/ft
RG-58AU mil. spec	10.5¢/ft
RG-174 micro. mil. spec	8.5¢/ft
RG-11U foam, 95% braid	19¢/ft
RG-11AU mil. spec	24¢/ft
RG-59U foam, 95% braid	11.5¢/ft
RG-59U mil. spec	11.5¢/ft
300 ohm ladder line poly ins	6¢/ft
450 ohm ladder line poly ins	8¢/ft
450 ohm ladder line bare, 100 ft	$11.00
8 conductor rotor cable (2 #18/6 #22)	15¢/ft
8 conductor rotor cable, heavy duty	34¢/ft
4 conductor rotor cable, 100 ft	$5.50
14 Ga. Stranded Copperweld, 70 ft roll	$4.95
14 Ga. Stranded Copperweld, 140 ft roll	$9.00
12 Ga. Solid Copperweld 50 ft multiples	8¢/ft
14 Ga. Solid Copperweld 50 ft multiples	6¢/ft
18 Ga. Solid Copperweld 50 ft multiples	4¢/ft
14 Ga. Stranded Copper	8¢/ft
8 Ga. Solid Aluminum 50 ft multiples	8¢/ft

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Ceramic insulators dogbone/strain	65¢/40¢
Coaxial lightning arresters	$3.75
Coax seal, roll	$1.95
W2AU balun 1:1 or 4:1	$14.25
W2AU END-sulator	$1.35
W2AU traps 10, 15, 20 or 40 mtr	$18.95/pr
W2AU new 30 mtr traps	$24.00/pr
W2AU traps 75 or 80 mtr	$26.25/pr
VAN GORDEN Hi-Q 1:1 balun	$8.95
VAN GORDEN Center insulator	$5.75
B&W Traps 40/80-10mtrs	$26.75/pr
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B&W 593/595 coax switch	$23.00/$27.35
B&W 5KW balun 1:1 or 12:1	$36.00
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HY-GAIN TH5MK2S/TH7DXS	$306.00/$375.00
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HUSTLER 6BTV new 6 band vertical	$123.25
HUSTLER 30 meter modification kits for older HUSTLER'S	$36.95
HUSTLER G6144B/G7144	$67.99/$98.99
BUTTERNUT HF6V	$108.29
BUTTERNUT TBR-160HD	$47.50
BUTTERNUT RMK-11/STR-11	$37.90/25.50
BUTTERNUT 2MCV/2MCV-5	$25.00/$31.00
MINI-PRODUCTS HQ-1 Mini Quad	$127.95
B&W 370-15 All Band folded dipole	$127.67
B&W AT-80 10, 15, 40, 80 mtr trap dipole	$43.50
LARSEN LM-150-MM 5/8 2mtr mag mnt	$35.25

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CIRCLE 4 ON READER SERVICE CARD

Announcing

● **Rockwell Collins Manning AD0C** - The amateurs at Rockwell Collins will be manning AD0C within the Collins Telecommunications Products Division complex beginning July 1. A special QSL card will be available for amateurs contacting the station during 1983. QSL to Box 728, Cedar Rapids, IA 52498. Look for AD0C on phone 28600, 21300, 21355, 14280, 14210, 7275, 7190, 3950; c.w. 30 kHz up.

● **Calgary, Alberta, Canada** - The Calgary Amateur Radio Assoc. will be operating ARS VE6WSJ from the site of the XV World Jamboree Mondial from the 1st to the 16th of July. The station will operate all bands and modes. Suggested frequencies: 7.030 MHz c.w. on the half hour, 14.190 s.s.b. on the hour.

● **Six Meter Invitational Net Activity Day** - From 1400Z July 2 to 0400Z July 3 Colorado S.I.N. is sponsoring a Six Meter Invitational Net Activity Day. All interested stations make QSO's on 50 MHz exchanging signal report, state, name, and S.I.N. number, if any. Scoring: S.I.N. members count 2 points and non-members count 1 point. Multiply total number of QSO points times number of states worked for total score. Certificates to highest Colorado winner and non-Colorado winner. Sticker endorsement to anyone who works 25 S.I.N. members. S.a.s.e. appreciated. Logs required for awards. Send logs including date and time of QSOs to W0ETT, P.O. Box 6602, Denver, CO 80206 within 30 days of end of QSO party.

● **Tom Sawyer Days Celebration** - The Hannibal ARC will issue a third annual special certificate from the National Tom Sawyer Days celebration, Hannibal, Missouri, on July 3–4. Hours: 1500–2100 UTC both days. Frequencies: phone 7.245, 14.290, 21.400, 28.770; c.w. 7.125 and 21.125 MHz. To receive the certificate send a large s.a.s.e. and your personal QSL card confirming the contact to Hannibal ARC, W0KEM, 2108 Orchard Ave., Hannibal, MO 63401.

● **NOARS from U.S.S. Cod** - Operations will start on Memorial Day weekend and run daily through Labor Day weekend. Look for operations in the lower portion of the general band 10 through 80 meters. Special Novice operations on June 4, 5; July 9, 10; and August 20, 21 in the middle of the Novice bands. QSL cards will be sent out confirming all contacts. A special 8 x 11 certificate will be available upon request with QSL and $1.00. Send all QSL's to WD8RZG.

● **WA8MTX from Monroe, MI** - Monroe County Radio Communications Assoc. will operate WA8MTX from the Floral City Festival at Monroe, MI, on July 8th and 9th from 1200–2400Z. Frequencies will be 10 kHz ± QRM above the lower edge of the general band s.s.b. and c.w. frequencies, 10–80 meters. Certificate for QSL and business-size s.a.s.e.. QSL to Bob Keenan, 3083 6th. St. D.B., Monroe, MI 48161.

● **W1FHP from Bethlehem, New York** - W1FHP and the Hen House Gang will operate Christmas-in-July on Saturday, the 9th of July on 10, 15, 40 meters. QSL Call Book address with 20¢ stamp and return address label if available for awards.

● **Space Day 83** - The Cascades ARS (CARS), in conjunction with the Michigan Space Center in Jackson, MI, is offering a Space Day certificate to all stations who work WB8CSQ during Space Day activities. Look for WB8CSQ on 3.900, 7.235, 14.285, 21.360, and 28.510 starting at 0000 GMT July 9 through 1700 GMT July 10. A $1.00 contribution is asked to cover cost of postage and materials. Mail log information and $1.00 to: CARS, Space Day 83, P.O. Box 512, Jackson, MI 49204.

● **Special-Event Station W8ZQ** - W8ZQ wil be on the air during the Jamboree in the Hills on July 15, 16, and 17. Frequencies will be 7.280 and 14.280 ±5 kHz. QSL to Joe McCready, WB8CTC, 111 Chase Ave., Bridgeport, OH 43912 (s.a.s.e.).

● **Special-Event Station K8EPV** - The Eastern Michigan ARC, K9EPV, will commemorate the annual Port Huron to Mackinac Island Yacht Race, July 16 and 17. Operation will be from 1500Z through 0300Z both days. Frequencies 3,910, 7,235, and 14,285 phone; 3,710, 7,110, and 21,110 c.w. A certificate is available for a legal-size s.a.s.e. to K8EPV, 654 Georgia, Marysville, MI 48040, or CBA.

● **K9ZEV from Peru, Indiana** - The Miami County ARC will be operating K9ZEV in celebration of the 24th annual Peru Circus City Festival, July 23. Operation will be primarily in the General Class s.s.b. portion of 40 meters from 1400 to 2300 UTC. Look occasionally on 20, 15, and 10 meters as conditions permit. A special QSL will be sent on receipt of s.a.s.e. QSL to Les Cattin, KA9FMZ, 163 W. 3rd St., Peru, IN 46970.

● **Brothers and Sisters QSO Party** - The Central Oregon Radio Amateurs (CORA) wil have a Brothers and Sisters QSO party July 23 and 24, 0600 hours Saturday to 1200 hours Sunday PDT. Operations will be from Brothers, OR (WN7ODD), and Sisters, OR (N7CSH), both in Deschutes County. Phone will be 10 kHz up from bottom of the general bands; c.w. 15 kHz up from bottom of Novice bands. QSL to CORA, P.O. Box 723, Bend, OR 97709 (s.a.s.e.).

● **W8JPW from Warren, Michigan** - The Tank-Automotive Command ARC will operate W8JPW on July 30 from 1300–2000Z. Frequencies: phone 7.250–7.274, 21.400, and 146.49 MHz; c.w. 7.055 from 1500–1700Z. Put their QSO number and frequency in upper-left corner of outer envelope. Send 9" x 12" s.a.s.e. for unfolded certificate, otherwise s.a.s.e. to: W8JPW, US Army Communications Command, Attn.: CCNC-TAC-M, 28251 Van Dyke, Warren, MI 48090.

● **Annie Oakley Special Event** - W8UMD, the Treaty City ARA, will operate the Annie Oakley special-event station from Greenville, OH, on July 30–31 from 1400–0100 UTC on Sat. and 1400–2200 UTC on Sun. Frequencies will be 20 kHz up from the General Phone portion of the 40 and 20 meter bands, with Novice on 40 and 15 meters. Send QSL and s.a.s.e. to TCARA, P.O. Box 91, Greenville, OH 45331 for certificate.

● **Davenport, Iowa** - The Davenport Radio Amateur Club will operate W0BXR during the Bix Biederbeck Memorial Jazz Festival, from 1600Z July 30 to 0300Z July 31, and from 1600Z to 2300Z July 31. Operation on phone and c.w., all bands about 10 kHz up from lower end of General class band edges. Certificate for large s.a.s.e. to DRAC, c/o WB0FBP, 2131 Myrtle St., Davenport, IA 52804.

● **W9CZH from Lincoln City, IN** - The Pike County ARC will operate W9CZH, Lincoln City, IN, from 1700Z July 30 to 1700Z July 31. Special QSL's will be issued for your QSL and s.a.s.e. to KC9VH, Box 311 R.R. 1, Winslow, IN 47598. Frequencies will be 3.925, 7.265, 14.305, 21.395 phone; 14.090 RTTY; 146.52 f.m.; 7.133 c.w.

● **The following hamfests, etc., are slated for July:**

July 2–3, **Maple Ridge ARC Hamfest 83,** Maple Ridge Fairgrounds, east of Vancouver, BC, Canada. Contact Bob Haughton, VE7BZH, Box 292, Maple Ridge, BC, Canada V2X 7G2.

July 6–10, **MARAC County Hunters Convention,** Charleston, WV. Contact WA3ZMY, 6101 Queen's Chapel Road, Hyattsville, MD 20782.

July 8–10, **ARRL Northwest Division Convention,** Spokane, WA. Contact Northwest '83, P.O. Box 3933, Spokane, WA 99220.

July 9, **Ninth Annual Ontario Hamfest,** Milton Fairgrounds, Burlington, Ontario, Canada. Contact Burlington ARC, Inc., P.O. Box 836, Burlington, Ontario, Canada L7R 3Y7.

July 9, **South Milwaukee ARC Swapfest,** Oak Creek, WI. Contact South Milwaukee ARC, Inc., P.O. Box 102, South Milwaukee, WI 53172-0102.

July 9, **Nittany ARC Hamfest and Computer Fair,** State College, PA. Contact Dave Buckwalter, KC3CL, 1635 Circleville Rd., State College, PA 16801, phone 814-234-0759.

July 9–10, **John Ross ARC Trade Fest and Flea Market,** Rossville, GA. Contact John Ross ARC, P.O. Box 853, Rossville, GA 30741, or call Murel Winans at 615-867-7739.

July 10, **Indiana State Amateur Radio Convention and Indianapolis Hamfest and Computer Show,** Indianapolis, IN. Contact Indianapolis Hamfest, Box 11086, Indianapolis, IN 46201.

July 10, **Third Annual Batavia Hamfest,** Alexander, NY. Contact GRAM, P.O. Box 572, Batavia, NY 14020.

July 10, **DuPage ARC Hamfest/Computerfest,** Downers Grove, IL. Contact W9DUP, P.O. Box 71, Clarendon Hills, IL 60514 (s.a.s.e.), or call 312-971-1156.

July 16, **11th Annual Mid-Summer Swapfest,** Cary, NC. Contact Cary ARC, P.O. Box 53, Cary, NC 27511.

July 16, **Annual Sheboygan County ARC Lakeshore Swapfest and Brat Fry,** Wilson Town Hall, south of Sheboygan, WI. Contact Sheboygan ARC, P.O. Box 895, Sheboygan, WI 53081, or call 414-457-3203.

July 16, **SCARC '83,** Augusta, NJ. Contact Lloyd Buchholtz, WA2LHX, 10 Black Oak Dr., RD 1, Vernon, NJ 07462.

July 16–17, **Quad-Co. ARC Hamfest,** Terry Park, east of Palmyra, IL. Contact Quad-Co. ARC, 602-D East Walnut, Chatham, IL 62629.

July 16–17, **Lane County Ham Fair,** Eugene, OR. Contact Tom Temby, 3227 Crocker Rd., Eugene, OR 97404, or call 503-689-1761.

July 17, **Wood County Ham-A-Rama,** Bowling Green, OH. Contact Wood County ARC, c/o Craig Henderson, Box 366, Luckey, OH 43443 (s.a.s.e.).

July 17, **West Jersey Radio Amateurs Hamfest,** Edgewater Park, NJ. Contact Mary Lou Shontz, N2CLX, 107 Spruce Lane, Rt. 16, Mt. Holly, NJ 08060, or call 609-237-3063.

July 23, **Mt. Beacon Hamfest,** Poughkeepsie/LaGrange, NY. Contact Art Holmes, WA2TIF, 2 Straub Dr., Pleasant Valley, NY 12569, or call 914-635-2614.

July 23, **Ski Country ARC Swapfest,** Glenwood Springs, CO. Contact Frank, WA0BBI, Box 280, El Jebel, CO 81628.

July 23, **Noarsfest,** Wellington, OH. Contact Noarsfest, P.O. Box 354, Lorain, OH 44052.

July 24, **Triple States RAC Wheeling, WV, Hamfest,** Wheeling, WV. Contact TSRAC, Box 240, RD 2, Adena, OH 43901, or call 614-546-3930.

July 29–31, **Annual Northwest DX Convention,** Seattle, WA. Contact Roy Foote, N7AIF, 3029 48th Ave. SW, Seattle, WA 98116, or call 206-935-8041.

July 29–31, **Ham Holiday '83,** Oklahoma City, OK. Contact Central Oklahoma Radio Amateurs, P.O. Box 15013, Oklahoma City, OK 73155.

July 30, **35th Annual Upper Peninsula Hamfest,** Ishpeming, MI. Contact George Lehtinen, W8IOC, 100 N. Daisy Rd., Ishpeming, MI 49849, or call 906-485-5038.

July 30–31, **Okanagan International Hamfest,** Oliver, BC, Canada. Contact John Juul-Andersen, VE7DTX, 8802 Lakeview Dr., Vernon, BC, Canada V1B 1W3.

July 30–31, **Western Carolina ARS Hamfest and Computer Fair,** Asheville, NC. Contact Garland Lance, NC4N, 854 Sandhill Rd., Asheville, NC 28806.

July 31, **Belvidere Hamfest,** Belvidere, IL. Contact Bob Anderson, K9DCG, 910 W. Locust St., Belvidere, IL 61008.

July 31, **BRATS Maryland Hamfest,** West Friendship, MD. Contact Mayer Zimmerman, W3GXK, at 301-655-7812

July 31, **Amateur Radio Public Service Assoc. of St. Joseph, MI, Swap and Shop,** Centreville, MI. Contact Warren Harder, N8EOX, 14820 Broadway Rd., Three Rivers, MI 49093.

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CQ

Overlooking southern Illinois, southeastern Missouri, and western Kentucky, 440 goes country!

From high on Bass Hill in southern Illinois a 440 f.m. repeater signal can be heard. Whether you live in this area or are there mobile, tune in. They'll be glad to hear from you.

440 GOES COUNTRY

BY JACQUELINE MOWERY*, N9DWC

It's a two mile gradual ascent along a narrow gravel road tortuously winding its way across wandering creeks to the top. The 200 foot tower stands tall on Bass Hill, which itself has attained an enviable growth among Southern Illinois Ozarks. From this point there is an unobstructed view into southern Illinois, southeast Missouri, and western Kentucky. It is here in this prodigious location that this repeater story begins.

R-S-T, as it relates to signals transmitted by my OM, Perry Mowery, alias K9DMG, when there is an impending radio project formulating in his mind, comes through as 4-9-3. Readability requries an educated speculation on my part. Signal strength overrides any other issue, and tone is somewhat imploring. I have learned over the years to finely tune my receiver, and then one day the signals improve and you hear it 5-9-9! What I received in this instance I knew from previous experience would not only involve a cash outlay, but would be an all-consuming project until it was well on its way.

While Perry is certainly not shy when it comes to rag chewing, he takes experimentation and high standards of performance most seriously. Our previous QTH's will prove to be a haven to the Martians when they discover the buried wire and concrete tower bases that would support Mr. Eiffel's structure, and antennas in such arrays that birds get IFR clearance before entering the controlled zone or elect to take the less hazardous ground route. It really came as no surprise that he wanted to put up a 440 repeater out here in the sticks! He hoped for participants in the area who would be interested enough in this new frontier to expend the extra efforts required to communicate via this frequency in which there is no tolerance for less than the highest possible performance of equipment and antennas.

During the course of an evening on a local 2 meter repeater (of which he is a charter member) Perry was off again on his favorite subject of development and installation of a 440 f.m. repeater, when one of the other charter members, Ed Monroe, WB9OPS, expressed an interest in a joint venture to pioneer this new frontier. This marked the beginning of a new friendship and many 2 meter s.s.b. meetings while plans were underway.

Because of the inherent characteristics of 440, tower site selection presented a civil-engineering survey equal to that required for a bridge to span the Grand Canyon, the ramifications of which cannot be dealt with here or within the confines of an 800-page book. On the existing site there stands a 300 foot tall railroad microwave relay tower on which K9DMG has previously been granted permission to install a repeater/antenna. Right in the middle of concluding the agreement, the railroad was sold to another company whose board of directors would have no such truck with a bunch of hams! And then along came John—John Kraatz, that is, whose business is commercial radio and who is also known as WB9HEB. John was looking to expand coverage for his commercial radio, and Perry, who had just become knowledgeable regarding landowners in this area, acquainted John with the possibility of getting a site adjacent to the railroad tower, while at the same time being quite certain that John would welcome the distinction of having the antenna for the first 440 repeater in the midwest mounted on *his* tower. John secured a long-term lease, and soon tower erection began.

During the period prior to the arrival of Perry's commercial equipment, the joint venture was privileged to use his 9 dB gain omnidirectional antenna, which was

*R.R. 1, Box 93, Jonesboro, IL 62952

Say You Saw It In CQ

K9DMG's station. You can find him operating between 160 and 440 (until he gets another idea!). Perry is absent, as he was taking the photos.

top mounted on the tower for a trial run to find out if 440 communication was feasible in this sparsely populated, rural area.

On a blustery November day in 1981, K9DMG and WB9HEB, armed with a power supply and a 440 f.m. transceiver, wound their way up Bass Hill to the site. Ed, WB9OPS, took up an anxious position with a hand-held transceiver at his home QTH some 23 miles east. K9DMG gave one call and contact with WB9OPS was made. Having heard of no interest except their own in 440, K9DMG nearly rolled down Bass Hill when W0RMS in Jackson, MO, some 20 miles west, responded. When WB9OPS heard K9DMG respond to W0RMS, his first thought was to send out the boys in the white coats; however, he soon learned that W0RMS had his five-month-old rig on scan, and it warmed right up to the very first signal it had ever heard! This unanimously confirmed the theory that communications on this frequency was certainly possible in these parts. Immediately thereafter, reports of being heard on scanners came in from Paducah, KY, and DuQuoin, IL, some 60 miles away, and 440 was on its way in the country.

The first equipment that was immediately available was a lightning-struck commercial repeater. Crystals were purchased and adjustments made to get it into the amateur band. Because of limited frequency movement, it was necessary to use the higher end of the band. They were on the air with 20 watts input through the duplexers into the antenna!

This marked the beginning of a most frustrating period. When this old repeater was working, there was nothing like the crisp audio and absolute freedom from man-made noise, but it can be likened to repair on an old house: you just get the porch rebuilt and it needs a new roof. There were problems with the tube socket on the final, and it suffered from an incurable case of temperature sensitivity. The crystal oven was eliminated to utilize a different type of crystal, which only solved one problem. New problems appeared with too much regularity. WB9HEB and K9DMG tired of climbing Bass Hill, and WB9OPS wearied of monitoring repairs, replacements, and adjustments. Consequently, a decision was made to purchase a new solid state unit.

However, it is with tremendous pride that we report that there were contacts during this turbulent period from Rolla and Poplar Bluff, MO, Rolla being 200 miles northwest. Therein began a search that parallels the needle-in-the-haystack. There were suppliers who advertised 440 equipment. It was learned very quickly, however, that due to a lack of interest and demand, there really was none available. This was disappointing, but it also served as a reminder that this really was a new frontier and gave further impetus to the task at hand.

Eventually a company was located that said it would build a repeater to specifications and deliver it within four to six weeks. Would you believe that it finally did arrive some four months later? But this is not the end of the story. Once installed, it had a little gypsy in it and wandered off frequency as much as 10 kHz with a few degrees change in temperature or 10 minutes in use.

It was then determined that the unit had the wrong frequency crystal! The resonant frequency was some 23 kHz higher. The manufacturer wanted to take another look at it, so it was boxed up and returned. Somewhere between there and the crystal manufacturer it was determined that the wrong formula had been used to calculate the crystal frequency. Once this was determined and the correct crystal was installed, it got back home for final adjustments. Since then it has been down to serious 440, and it has proven to be a very stable performer.

The 440 f.m. repeater operates on 449.025 MHz input with the conventional 5 MHz split, transmitting on 444.025. The repeater is an extremely sensitive solid state receiver in a die-cast-aluminum enclosure, with a 12 watt solid state transmitter in an appropriate enclosure. The transmitter is used as an exciter to drive a 50 watt r.f. amplifier. The machine utilizes a commercial four-cavity duplexer capable of 200 watts with 90 dB attenua-

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CIRCLE 57 ON READER SERVICE CARD

Riding shotgun is Jake, whose expression clearly indicates that he would rather be "moving out" that holding while N9DWC enjoys a short motorcycle mobile QSO from the farm, a scant 1½ crow-flying miles from the repeater site.

tion. The 50 watt signal is fed to a commercially built 13 dBd omnidirectional antenna, cut to frequency, through the lowest loss line that is available.

The antenna is 185 feet above ground. It is of necessity side mounted on the tower immediately under the bottom of the commercial antenna. It is significant to note that there has been no interference from either service.

The repeater is housed in a concrete-block building with a controlled environment. These amenities are undoubtedly conducive to longevity and reliability. The chain-link fence surrounding the building repels the two-legged type rattlesnake, while the natural species serves as the sentry.

There has been a tremendous amount of interest in the three state area. There have been roundtables with as many as 11 area hams; there are others with high gain antennas 80 miles distant who consistently access the repeater. Mobile operators 40 miles out get in full quieting at times. Campers "down from Chicago" enjoying a weekend in Giant City State Park were amazed to find 440 here, and mobile opeators from Ø, 9, and deep into 4 land find "Country 440" the way to go. Somewhere along the way our request to be listed in the repeater directory lost its direction; however, please be assured that we are here.

A significant turn of events was beginning to take place, to the ultimate end that this joint venture now includes two new hams (or "hamettes," or "hamlets"), Jane, KA9OCL, XYL of WB9OPS, and me, XYL of K9DMG. We believe it may be somewhat unique to have had two XYL's make their voice communication debut on 440.

Come on along. Go "Country 440." Whether you live in the area or are just traveling through, the fun is just beginning, and you'll find a lot of friends here.

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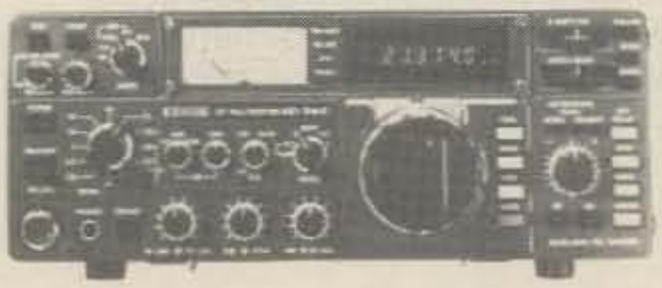

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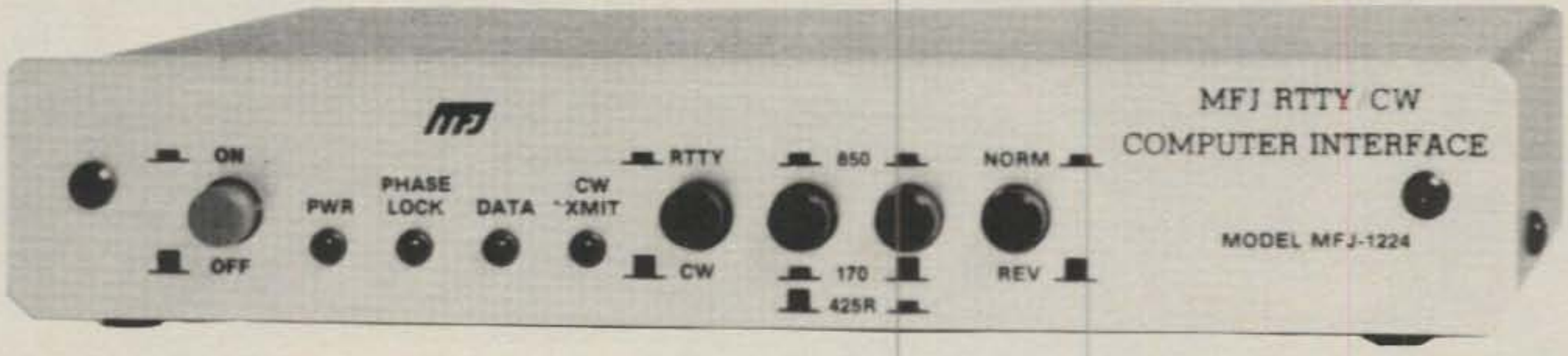

- *Copies on both mark and space tones.*
- *Plugs between rig and VIC-20, Apple, TRS-80C, Atari, TI-99, Commodore 64 and most other personal computers.*
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It plugs between your rig and your VIC-20. Apple, TRS-80C, Atari, TI-99, Commodore 64, and most other personal computers.

It uses the Kantronics software which features split screen display, 1024 character type ahead buffer, 10 message ports (255 characters each), status display, CW-ID from keyboard, Centronic type printer compatibility, CW send/receive 5-99 WPM, RTTY send/receive 60, 67, 75, 100 WPM, ASCII send/receive 110, 300 baud plus more.

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In addition to the Kantronics compatible socket, an exclusive general purpose socket allows interfacing to nearly any personal computer with most appropriate software. The following TTL compatible lines are available: RTTY demod out, CW demod out, CW-ID input, +5 VDC, ground. All signal lines are buffered and can be inverted using an internal DIP switch.

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Aluminum cabinet. Brushed aluminum front panel. 8x1¼x6 inches. Uses 12-15 VDC or 110 VAC with optional adapter, MFJ-1312, $9.95.

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Use your personal computer to receive commercial, military and amateur RTTY/ASCII/CW traffic.

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It plugs between your receiver and VIC-20, Apple, TRS-80C, Atari, TI-99, Commodore 64 and most other personal computers.

It uses Kantronics software which features CW receive 5-99 WPM, RTTY receive 60,67,75,100 WPM, and ASCII receive 110, 300 baud, plus more.

An automatic noise limiter helps suppress static crashes for better copy, while a simple 2 LED tuning indicator system makes tuning fast, easy and positive.

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11307	24	1.25	1.14	.95
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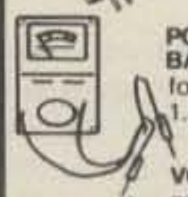

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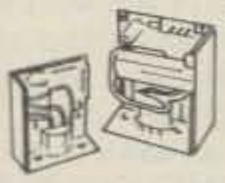

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CIRCLE 58 ON READER SERVICE CARD

Novice

a monthly feature by
BILL WELSH, W6DDB

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Dipole Antennas—Conclusion

The first two parts of this article appear in the two preceding issues of this magazine. To receive maximum benefit from this series, all three parts should be read. None of these parts stands alone.

Dipole Construction Materials

You should gather the following items before you start constructing your dipole.

Wire. Sixteen gauge copperweld wire is the best antenna wire to use. Obtain twice the single leg cut length of wire shown in Table I (Part I, May 1983 issue) for the dipole you are going to assemble. As an example, if you are constructing the popular 40 and 15 meter dipole, you need 68 feet 4 inches of wire.

Ordinary (soft-drawn) copper wire will quickly stretch when it is subjected to the strains caused by wind and feedline weight. The resultant longer antenna will be resonant below the desired frequency segment, reducing its efficiency at the desired point. Hard-drawn copper wire does not stretch as quickly as soft-drawn wire, but it is not able to retain its original dimension as well as copperweld. Copperweld has a steel center to provide the required strength, plus a copper outer surface for low-loss conductivity of radio frequency currents. The best radio stores usually stock copperweld wire. Copperweld is a trade name; the correct term is *copper-clad steel* wire.

Solid (single strand) wire is preferred over stranded wire for use in building dipoles. Stranded wire exhibits a noticeable inductive effect due to its twisted (coiled) configuration. Also, r.f. tends to flow along the outer circumference of each strand of wire, and the physical length of a single strand is longer than the composite stranded wire length. In other words, if you unwound a single strand of wire and straightened it, that strand would be longer than the piece of wire from which it was taken. These two factors combine to cause a dipole to resonate below the intended frequency when it is built per standard formulas but using stranded wire.

The use of a smaller diameter wire (such as 18 or 20 gauge) produces a dipole which is more sharply resonant to the frequency to which it is cut. Larger diameter wire (such as 12 or 14 gauge) produces a dipole that has a broader resonance characteristic and provides satisfactory performance over more of the band. Sixteen-gauge is a good size to use; it provides a satisfactory broadband characteristic without being too hard to handle.

If you are going to erect a temporary antenna, and the only wire you have available has an insulation covering, do not hesitate to use it. Just scrape the insulation off the end points where the solder connections are to be made. The insulation remaining on the rest of the wire will not significantly degrade the wire's performance.

Coaxial Cable. Other feedlines can be used, but coax is so commonly used in this application that this coverage is limited to just that type of r.f. transmission line.

If you have already determined how long your feedline must be, obtain that length of RG-213/U coax. If you are not sure about this dimension, get about 10 feet more coax than you think you will need. Remember to add in the coax length you will need to reach your equipment in your shack.

If you have decided to use a resonant feedline and your physical layout is such that you can do it without an excessively long feedline, use Table II (Part I, May 1983 issue) to select the appropriate length of coax. Add 6 inches to the stated length, since you will use it making the center connections to the dipole.

Purchase a good coaxial cable for use as your feedline. The thinner RG-58 and RG-59 coax cables are cheaper and easier to use than RG-213/U, but fig. 3 (Part II, June 1983 issue) shows that they have higher attenuation (loss) than RG-213/U. The higher attenuation of these smaller cables will result in less of your transmitter's r.f. output reaching the antenna, which means your radiated signal strength is reduced. This transmission loss is important, but it is usually less important than the reception loss. We frequently want to contact amateurs who are not putting strong signals into our area. If a very weak signal is applied to an inefficient (high attenuation) transmission line from the antenna, it may be too weak to be copied as it is applied to your receiver's antenna input.

Foam polyethylene coaxial cables have less loss (attenuation) than the equivalent solid polyethylene types. However, foam coax is more susceptible to physical damage than coax with solid insulation, and extreme care must be taken to avoid a sharp bend in any foam coax feedline. Coax impedance is lowered if the distance between the inner (go line) and outer (shield) conductors is reduced, such as at a sharp bend. The efficiency of such a damaged line is decreased and the s.w.r. rises.

Support Line. It is best to use non-conductive line to support both ends of a dipole. Nylon line and glass line are preferred over lower strength materials such as clothesline. Some surplus outfits have parachute cord available at reasonable cost. Sporting goods stores and marine (boat) suppliers are also sources of good support line, but at a higher cost. Be sure

E.D. Stoetzel, KA9DKS, of Washington, Illinois, is an 82-year-old WW I veteran who took up amateur radio to maintain contact with people should he become physically incapacitated and to keep his mind active. He earned his B.S. in M.E. from the University of Illinois in 1926 and he was married the same year. He has two sons, eight grandchildren, and three great grandchildren. He received his Novice license in February of 1979 and is "enjoying the use of one of God's miracles." His station includes a Kenwood TS-520S Transceiver with DG-5 digital display and external speaker, Swan WM-2000-H s.w.r./power meter, Hy-Gain TH-6 10/15/20 meter Yagi-Uda antenna mounted atop a 48 foot Rohn foldover tower, and inverted Vee antennas for 40/80 meters. He has had 159 contacts, including contacts with amateurs in 36 states, 4 countries, and 3 continents. KA9DKS has received 82 QSL cards so far. He is a member of the Peoria Area Amateur Radio Club and the American Radio Relay League. KA9DKS is a good example for those who think they may be too old to get into amateur radio. I once had a student who was 92 when he started attending my Novice course, and he became a very active General class licensee.

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you get enough support line to meet your requirements.

If you must use wire to support your dipole, it should be broken up (using insulators) into segments that are less than one-quarter wave long at the highest frequency at which the antenna is to be used. Wire should not be used in this application if non-conductive line is available.

Insulators. Obtain three good insulators. If you prefer to do so, purchase a special dipole center insulator; however, this more expensive item is not needed. Do not use power-line (brown) insulators; they are bulky and lossy at radio frequencies. Sturdy, clean insulators will suffice. They are usually 0.75 to 1.5 inch in diameter and 1.5 to 4.0 inches in length. Better insulators are ribbed to increase the r.f. leakage path between the two ends of the insulator.

Tools. The basic items you need to construct a dipole antenna are a pair of dykes (wire cutters), needlenose pliers, a sharp knife, rosin-core 60/40 solder, a 100 to 250 watt soldering gun or iron, and a tape measure.

Other Material. You will need a connector that matches the one on your equipment to which your antenna will be connected; this is usually a PL-259 coax connector. You will also need a pencil, "marks-a-lot" (or its equivalent), and a roll of electrical insulation tape. If you are going to mount one end of your dipole to a non-fixed point, you will also need a pulley and an appropriate weight.

Dipole Construction and Installation

If you use the following step-by-step procedure, you should have no trouble constructing and erecting a good dipole antenna:

(1) Cut both sections (legs) of the dipole to the dimension shown in Table I for the antenna you are building. Do not splice sections of wire to obtain a required leg length; each section should be a single piece of wire, and the wire should be identical in both legs of the dipole.

(2) Using a tape measure and a "marks-a-lot," mark the point that is 6 inches from each wire end. Make four marks, with two marks on each dipole leg. Do not nick or bend the wire to indicate these 6 inch points.

(3) Using a knife, carefully scrape both ends of both legs down to clean (bare) metal from each end point to each 6 inch marker. Do not nick the wire during this cleaning operation. Some insulations leave the wire with a shiny and clean look; do not be fooled by such an appearance. Make certain every leg end is cleaned down to bare metal.

(4) Insert one end of a leg through the eye of an insulator, and bend it back (in the insulator groove) to where it extends past the area that was scraped clean at the end of the wire. Leave room to make at least three tight wraps of the wire end around the cleaned portion of the wire. Continue wrapping the wire end around the cleaned wire segment until all of it has been wrapped, or until you reach the inner edge of the cleaned segment. The wire wrap (discontinuity) should end at the inside 6 inch marked point. Solder the wire wrap area well but without allowing solder to flow past the 6 inch marker (onto the unscraped wire).

(5) Insert the other end of the same dipole leg through an eye of another insulator. Then wrap and solder it as detailed in the preceding step.

(6) Insert one end of the second dipole leg through an eye of the third insulator. Then wrap and solder it as detailed in step (4).

(7) Insert the other end of the second dipole leg through the unused (empty) eye of either insulator attached to the first dipole leg that was assembled. Then wrap and solder this last free end as detailed in step (4). Your dipole antenna is now assembled. It must have the feedline attached and then placed into position to be ready for use.

(8) Carefully cut the outer protective jacket off one end of the coax feedline exposing 6 inches of the shield that surrounds the insulated center conductor. It is usually easy to make a slice around the circumference of the coax and 6 inches from the end. Then make a slice (groove) between the previous slice and the end of the coax. Neither slice should be deep enough to cut any wire of the shield beneath this outer jacket. The jacket can easily be pulled off since it will tear at the weakened (grooved) points.

(9) Use a pencil to poke a hole through the exposed shield wire. This shield separation should be made about 1 inch away from where the protective jacket was cut off, which is about 5 inches from the end of the unjacketed coax. Just gently push the shield strands aside to provide enough room to pull the insulated center conductor out through the side of the shield.

(10) Bend the coax over one of your forefingers such that the shield separation (hole) is on top. Use a pair of long-nose pliers to pull the insulated center conductor out through the shield opening. Do this carefully to avoid breaking shield strands. It helps to bunch the shield towards the hole.

(11) If the insulator eye is large enough to permit it, insert the end of the coax shield (from which the center conductor was extracted) through either eye of the center insulator of the dipole. Pull the shielding through the insulator's eye to where the separation point between the shield and the center conductor is about 1 inch away from the insulator, and wrap the shield around the existing wire wrap of that dipole leg. If the insulator eye is too small to easily accept the shield lead, just wrap it around the original wire-wrap point without going through the insulator's eye. In either case, the shield wrap must not extend past the original wire-wrap point. The shield is then soldered in place, taking care not to allow solder to flow past the marked and cleaned area. Use enough heat to cause the solder to flow through the shield and attach securely to the wire wrap beneath the shielding. Do not allow parts to move before any solder joint is cooled and set. The shield must take the full strain imposed by the weight of the coax feedline; the center conductor should not be subjected to any of this strain.

(12) Cut the extracted coax center (go) line to a length that will allow you to conveniently attach it to the other half of the dipole without applying any strain to this center lead. Bare enough wire from this lead to enable you to thread it through the other eye of the center insulator (or directly, if necessary) and wrap it around the existing wire wrap at that point. Wrap the bare go line around the wire wrap and solder it in place. Do not allow the new wire wrap or the solder to extend past the original marked and cleaned wire segment.

(13) Prevent water from entering the exposed upper (antenna) end of your coax feedline by taping that area with a waterproof electrical tape such as Scotch 33. It is best to warm the roll of tape before you use it to seal this exposed coax. The warm tape will conform to the odd shape very well and will seal it against moisture intrusion. Failure to seal the exposed end of a coax feedline can allow water to flow through the coax and into the shack. If nothing else, moisture can attack the coax and alter its electrical characteristics. The feedline connection to the dipole is completed at this point, and the dipole should then be installed per the instructions in the following steps. The appropriate connector will be attached to the other end of the feedline after all other steps have been completed.

(14) Attach an adequate length of a suitable non-conductive support line to either end of your assembled dipole. This line is threaded through the unused eye of an end insulator. It is pulled into the associated insulator groove and then tied securely.

(15) Repeat the preceding step as you attach the second piece of support line to the other end insulator.

(16) Hoist the dipole into position and secure it there using the support lines. Tie both support lines securely, leaving enough extra line to enable the antenna to be lowered to the ground. The installation should be neat and it should be inaccessible to children and pets.

(17) Route your feedline into your station as directly as possible. Avoid sharp bends in the coax, particularly where it droops over an edge such as a rain gutter. If possible, take some of the feedline weight off the antenna center point either by supporting the antenna at its center

Say You Saw It In CQ

(usually impossible), or by securing the feedline to a rigid point.

(18) After routing a non-resonant feedline to your equipment, cut it to a length that allows a reasonable amount of equipment movement in your shack (about 2 feet).

(19) Attach a connector to the coax to match the antenna receptacle on your equipment. This is usually a PL-259, and that attachment procedure is detailed in this step (see fig. 7). The attaching collar can be threaded off PL-259 connectors. It *must* be removed from the PL-259 and slipped onto the free end of the coax feedline before one starts to attach the coax to the PL-259. Most of us have failed to do this one time, and we have had to disassemble the connector to correct this error. The separated collar must be positioned correctly on the coax with its front end towards the free end of the coax. Just leave the connector collar dangling on the feedline until the coax has been properly attached to the PL-259. Position the coax so that the free end extends about 0.5 inch past the tip of the PL-259, and mark the protective jacket at the point where it is to be cut off and threaded into the back end of the connector. Cut off the external jacket to this point without cutting the shield wires beneath it. Use the previously described grooving procedure.

Again position the coax so that its free end extends about 0.5 inch past the tip of the PL-259 (and the jacket cutoff point matches the inner end of the rear connector cavity), and slice a section (15/16 inch) of the shield away to show where the shield and center conductor insulation must be removed to allow just the center wire to protrude through the hole in the center pin of the PL-259. Carefully slice the shielding and insulation from the end of the coax to the marked point. This will leave about $1\frac{3}{16}$ inch of bared center conductor. Ease the coax end into the PL-259 without bending the center wire or shield braid. Slip the center lead into the hollow PL-259 center pin. Now thread the connector onto the jacket portion of the coax using adjustable pliers. As the connector collar is threaded onto the coax protective jacket, the coax center wire will protrude through the front of the PL-259, and the exposed shield will appear through the solder holes near the middle of the PL-259. Continue the threading action until the coax jacket trim point is firmly butted up against the front wall (barrier) of the rear cavity in the PL-259. Trim off the excess lead protruding past the front of the PL-259's center pin and solder it in place.

(20) Thread the connector collar down over the body of the connector and attach the connector (feedline) to your equipment.

Dipole Test and Maintenance

If you have access to a standing-wave ratio (s.w.r.) bridge, it is a good idea to check and record the apparent s.w.r. when the antenna is initially installed, and at regular 6 to 12 month intervals thereafter. S.w.r. meter accuracy does not have to be extremely good; even very inexpensive s.w.r. meters can provide satisfactory results. You just want to know if the initial apparent s.w.r. is reasonable (below 3 to 1), and your later checks will be to ascertain that antenna system performance remains satisfactory.

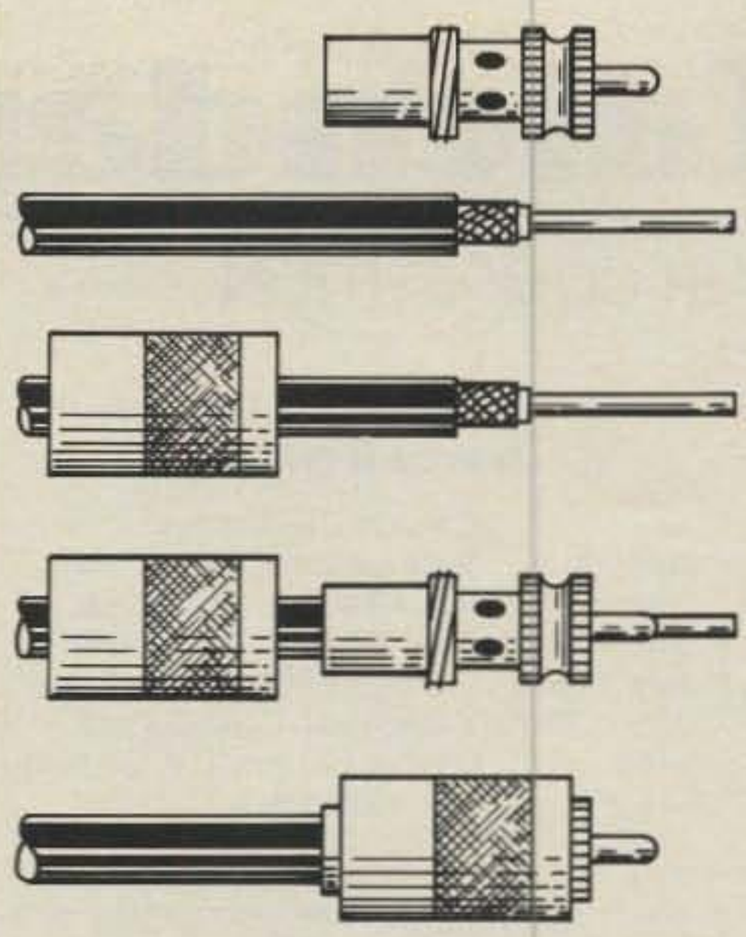

Fig. 7– PL-259 connector attachment to RG-213/U coaxial cable.

Most amateurs connect an s.w.r. meter in the shack where it can be used conveniently. This is satisfactory when the s.w.r. readings are just to be used for purposes of comparison. However, it should be understood that an s.w.r. reading cannot indicate the true antenna condition when the s.w.r. meter is connected at the equipment end of the feedline. The s.w.r. bridge compares reflected (reverse) voltage to forward voltage to determine s.w.r. An ideal situation would have every bit of r.f. energy accepted by the antenna from the feedline and radiated; in this ideal situation, the voltage maximum and minimum values are the same along the feedline, s.w.r. is one to one, and no r.f. is reflected back along the feedline from the antenna to the transmitter.

With the s.w.r. meter in the shack, the forward (incident) voltage it reads is not the voltage applied to the antenna; it is a higher value that has not been reduced by feedline loss (attenuation). Similarly, the voltage reflected by any antenna impedance mismatch is lower at the s.w.r. meter than it is at the antenna. Consequently, the s.w.r. meter is comparing a reverse voltage that is below the actual antenna value against a forward voltage that is above the actual antenna value. To put this another way, if the feedline is long and bad enough, the s.w.r. indication could be satisfactory with no antenna (or other terminating load) attached to the far end of the feedline. The preceding explanation is included in this article to help you understand that s.w.r. readings should not be accepted as being correct when the s.w.r. meter is installed in the shack; such readings just provide reference values that can be used when making later tests.

There is no reason to leave an s.w.r. meter connected in series with a dipole feedline; it is a test instrument that should be removed when tests have been completed. S.w.r. meters are built into some modern transceivers. Dipole input impedance varies in accordance with height above electrical ground; consequently, the resultant s.w.r. can change between wet and dry seasons. If such a change does not cause the apparent s.w.r. to exceed 3 to 1, I advise you to leave your dipole at its installed height. If the s.w.r. is excessive, a change is advisable. Antenna height changes are easier to accomplish when the center insulator is attached to a cord through a pulley, enabling one to raise or lower it with minimum effort.

Pure water is an insulator, but when it mixes with contaminants collected on antenna insulators, r.f. leakage can occur. It is advisable to clean antenna insulators at least once a year. Except for cleaning insulators, it is advisable to leave a dipole antenna alone if it is functioning satisfactorily.

73, Bill, W6DDB

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CIRCLE 26 ON READER SERVICE CARD

Contest Calendar

a monthly feature by
FRANK ANZALONE, W1WY

NEWS/VIEWS OF ON-THE-AIR COMPETITION

From time to time we receive complaints from non-contesters about the QRM caused by contests on weekends. This is especially evident after one of our World-Wide or WPX Phone Contests, especially on the 20 meter band. There is no denying that a major international competition will create a problem for fellows whose operation is limited to weekends and to the many so-called nets. Contest activity is generally confined to the lower portion of the U.S. 20 meter phone band. The more important and legitimate nets operate above 14,300 MHz and experience little or no QRM problems from contest activity.

It has been suggested that contest operation be restricted to certain portions of the band. Most stateside and QSO party activities do limit their operation to suggested frequencies, but to apply the same restrictions to a major international competition the size of our World-Wide and WPX Contests would be impossible. Even if we were able to control stateside operation, in no way could we be expected to have any control over DX stations.

However, now that the expansion of the 20 meter phone band is finally a reality, it's going to be most interesting to see what happens come October 29th and 30th during the World-Wide DX Phone Contest. The W/K's for sure are going to move down to that new territory below 14,200 MHz. That will certainly take a lot of pressure off that portion of the band which is now overcrowded even on non-contest weekends. And 20 is going to be more congested, as a lot of the traffic on 10 and 15 will be moving to the lower band due to the deteriorating conditions on the higher frequencies.

The band expansion should also give the SSTVers who are confined to a few kHz each side of 14,230 a little more looking space. Try to avoid creating a pile-up on this narrow portion of the band. Now that we all have been given a little more breathing space, let's try to share it equally.

Keep in mind that the deadline for the October issue is July 15th and August 15th for the November issue.

73 for this time, Frank, W1WY

14 Sherwood Road, Stamford, CT 06905

Calendar of Events

*	July	1	Canada Day Contest
	July	2-3	Venezuelan Phone Contest
	July	9-10	IARU Radiosport Contest
†	July	16-17	SEANET C.W. Contest
†	July	16-17	Colombian Contest
	July	30-31	Venezuelan C.W. Contest
	Jl/Ag.	30-1	County Hunters CW Contest
	Jl/Ag.	30-1	"Armadillo Run" Contest
	Aug.	6-7	Illinois QSO Party
	Aug.	13-14	DARC WAE C.W. Contest
†	Aug.	13-14	SEANET Phone Contest
	Aug.	20-21	SARTG RTTY Contest
	Aug.	27-28	All Asian C.W. Contest
	Aug.	27-28	Alabama QSO Party
	Aug.	27-28	Occupation Contest
	Sep.	3-4	DARC "Corona" 10M RTTY
	Sep.	3-4	IARU Region 1 Field Day
	Sep.	10-11	G-QRP Club Activity
	Sep.	10-11	Cray Valley SWL Contest
	Sep.	10-11	DARC WAE Phone Contest
	Sep.	10-11	ARRL VHF QSO Party
	Sep.	10-11	YLRL "Howdy Days"
	Sep.	17-19	Wash. State QSO Party
	Sep.	24-25	Delta QSO Party
	Sep.	24-25	Maine QSO Party
	Oct.	8-9	GARTG SSTV Contest
	Oct.	22-23	YLRL Anniv. C.W. Party
	Oct.	**29-30**	**CQ WW DX Phone Contest**
	Nov.	5-6	YLRL Anniv. Phone Party
	Nov.	12-13	DARC WAE RTTY Contest
	Nov.	**26-27**	**CQ WW DX C.W. Contest**

** Covered last month*
† Not official

Venezuelan Contest

Phone: July 2–3 C.W.: July 30–31
0000Z Saturday to 2400Z Sunday

This is the 21st yearly contest celebrating Venezuela's independence. It's a world-wide type contest; therefore, do not confine your activity to working YV's only. Use all five bands, 10 through 80 meters. There are four classes: Single operator, single and all band, and multi-operator single and multi-transmitter.

Exchange: RS(T) plus a QSO number starting with 001.

Points: Contacts between stations in different countries, 2 points. Between stations in the same country zero (0), but permitted for multiplier credit.

Multiplier: One for each YV call area, each U.S. call area, and each country (including own) worked on each band.

Final Score: Total QSO points from all bands multiplied by the sum of the multiplier from each band.

Awards: A plaque to the highest scorer in each class. Medals to the highest scoring single operator in each continent and the Bolivarian countries (Bolivia, Colombia, Ecuador, Panama, Peru).

Certificates to stations in the Americas working 15 YV stations and 10 different countries. European and African stations working 10 YV's and 10 countries. Asia and Oceania stations working 5 YV's and 10 countries.

Use a separate log sheet for each band, and a summary sheet showing the scoring, your name and address in block letters, and the usual signed declaration. It is requested that all award applicants include a remittance of $2.00 or its equivalent in IRC's.

Mailing deadline is August 15th for phone entries and September 15th for c.w. They go to: Radio Club Venezolano, P.O. Box 2285, Caracas 1010-A Venezuela.

IARU Radiosport

Starts: 0000Z Saturday, July 9
Ends: 2400Z Sunday, July 10

This is a worldwide competition, all bands, 160 through 2 meters, single and multi-operator.

There are three categories: c.w. only, phone only, and mixed c.w. and phone. Multi-operator use mixed mode, single transmitter only.

Each station may be worked once per band regardless of the mode. Crossband contacts not permitted except via Oscar, which counts as a separate band.

Single operator stations are limited to 36 hours of operating time. Off times must be at least 30 minutes and indicated in your log. There is no time limit for multi-stations, but operation must remain on the same band for at least 10 minutes.

Exchange: RS(T) and your ITU zone.

Points: One point for QSOs with stations in your own zone, 3 points if station is outside your zone but on the same continent, and 5 points if on a different continent.

Multiplier: Sum of different ITU zones worked on each band.

Final Score: Total QSO points from all bands times the sum of the multiplier from each band.

Awards: Certificates to the top scorers in each category, in each ARRL section, ITU zone, and DX country. Achievement awards are available for making 250 and 1000 QSOs and/or contacting 50 or more zones. In case of multiple award levels achieved, only the highest award will be issued.

U.S. and Canadian entries are requested to use official log and summary sheets which may be obtained from the ARRL. Also request forms CD-77, CD-175, and the ITU zone list. A large s.a.s.e. with at least 37¢ postage will get you a good supply of forms.

All entries worldwide go to: IARU Headquarters, Box AAA, Newington, CT 06111 U.S.A. Mailing deadline is August 30th.

Say You Saw It In CQ

SWD-1 VIDEO CONVERTER

FOR CABLE TV

The SWD-1 Video Converter is utilized on cable TV systems to remove the KHz's signal from a distorted video (channel 3 in/out) and also pass thru the normal undistorted/detected audio signal. Rocker switch selects operating mode to remove KHz's distortion from the video or pass all other channels normally. Simple to assemble—less than 30 minutes. Pre-tuned. Input/output Channel 3. Impedance 75 ohms. 117VAC.

SWD-1 Video Converter Kit **$69.95**

0-35dB VARIABLE GAIN
RF AMPLIFIER

USES TWO REVOLUTIONARY NEW HYBRID BROADBAND AMPLIFIER ICs

Works on all RF Signals from 40-900MHz

ALL-2VG AMPLIFIER

COAX FEED POWER SUPPLY

EXCELLENT FOR USE WITH:

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- Voice Communications
- MATV Systems
- CCTV Systems
- Video RF Line Amplifiers
- Frequency Counters
- Oscilloscopes
- FM Broadcasts

Now you can use one TV/FM Antenna to cover all close and distant stations without experiencing overloading problems. Ideal for outdoor and indoor use. I/O impedance is 75 ohms. Power Supply is separate coax feed system which allows amplifier to be located anywhere in cable run. Power Supply has knob to control varible gain, LED power on indicator and on/off switch.

ALL-2VG Wired and Tested. **$49.95**

Our New STVA 14.5dB GAIN, 14 ELEMENT CORNER REFLECTOR YAGI ANTENNA

STVA-3 Yagi Antenna, 14.5dB Gain, Selectable 75 or 300 ohm Channel 60-80. ..... **$19.95**

STVA-4 Yagi Antenna, 14.5dB Gain, Selectable 75 or 300 ohm Channel 44-52. ..... **$19.95**

RG-59/U 75 ohm Low Loss Coax Cable . . . $.12p/ft. **F-59** Coax Connector. . . $ .39 ea.

MT-1 Special UHF 75-300 ohm Matching Transformer ..... **$1.45 ea.**

AMATEUR — ETV 32 ELEMENT YAGI ANTENNA

- Not A Kit
- 1.9-2.5 GHz
- 38½" Long
- 23dB Average Gain
- Commercial Grade
- Die Cast Waterproof Housing with 4¼" x 2½" Area for Electronics
- Includes P.C. Probe, F-61 Connector and Mounting Hardware

MAE-2 32 Element YAGI Antenna **$23.95**

Kato Sons' Regulated Varible DC Power Supply

For use with KSDC-KIT 1.9 - 2.5GHz Down Converter. Completely assembled with Attractive Cabinet, TV/Converter Mode Switch, Frequency Control and LED Indicator.

Model KSPS-1A Assembled Power Supply **$23.95**

SPECIAL PACKAGE OFFER

ORDER ALL THREE ITEMS

MAE-2, KSDC-KIT and KSPS-1A for Only **$74.95**

Regular price if ordered separately $82.85

— CO-AX CABLES ARE NOT INCLUDED —

Switch to Bambi™!

Electronically

Bambi Electronic Video Switch ... makes switching of your VCR/VTR, Pay TV Decoders, Cable TV, Video Discs, Video Games, Closed Circuit TV, Antennae and Microcomputer as easy as pushing buttons.

The Bambi Electronic Video Switch is an electronic computerized switching network with memory which can accept up to six different sources of video signals and provide the flexibility of directing the inputs to any or all of the three outputs.

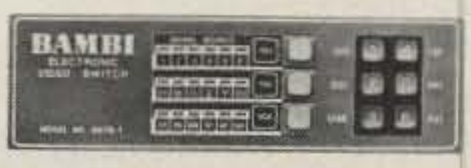
Now you can eliminate ... the drudgery of disconnecting and reconnecting your video equipment each time you use it ... the tangled mess of cables which are impossible to trace out ... not being able to use more than one function at a time.

Bambi lets you enjoy using your video equipment the way it should be ... electronically and on line at the push of a button.

Model BEVS-1 Completely Wired and Assembled. Includes comprehensive Instruction/Operation Manual and Decal Set for customizing your Video Switch installation.

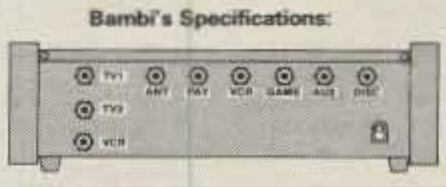
$129.95

FREE Bambi Poster with any purchase



Bambi's front panel was designed with the user in mind. Computer styled construction, with soft-touch keyboard (rated for over 10 million operations), arranged in matrix form allows easy input/output selection without refering to charts. Functions selected through the keyboard are immediately displayed on the 18 LED status indicators.

Bambi's Specifications:



Input/Output Impedance	75 ohm
Signal Loss	3dB ±1dB
Noise	4dB ±1dB
Input Return Loss	12dB min.
Isolation	65dB min.
Power Req.	117VAC 60 Hz, 2W
Dimensions	10¼ W x 6⅜ D x 3⅛ H
Weight	4½ lbs

Check the quality of Bambi against that of much higher priced competition. All solid state electronic switching provides low attenuation (3dB), wide frequency response (40-890 MHz), and excellent isolation between signal sources (each I/O section individually sheilded for 65dB min. isolation).

NEW VCR Quality

MODULATOR

Not a Game Type Modulator

The MPS-1 Kit converts Video/Audio signals to a crystal controlled RF output for TV Channels 3 and 4. The MPS-1 Modulator's adjustable inputs are designed to match all TV Cameras and VCRs and features a voltage regulated power supply, power switch and LED indicator. No Tuning Required. Operates on 117VAC. Ideal for use with our new Debbie CCTV-1 and revised Bambi BEVS-1S.

Assembly Time Approximately 5 Minutes.

MPS-1 Modulator Kit. $39.95

SEE PACKAGE OFFER BELOW FOR ANTENNA, DOWN CONVERTER, POWER SUPPLY, & RF AMP.

Kato Sons' Down Converter Kit ★1.9 - 2.5GHz★

Designed for Simple Simon by former Japanese CQ Amateur Magazine's UHF Editor/Engineer. Unit utilizes new ingenious Printed Circuit Probe for maximum gain. Circuit board fits inside MAE-2 antenna housing. Requires mechanical assembly only. All electronics are pre-soldered and pre-tested. Usable up to approximately 15 miles

Model KSDC-KIT 1.9 - 2.5GHz Down Converter Kit **$34.95**

Kato Sons' RF Amplifier ★22dB Gain★

High quality 2 stage low noise RF Amplifier for 1.9 to 2.5GHz. Unit requires aproximately 10 minutes assembly. Fits in same housing with down converter. Covers distances of up to 30 miles.

Model KSRF-2 RF Amplifier **$23.95**

SPECIAL PACKAGE OFFER

ORDER ALL FOUR ITEMS

MAE-2, KSDC-KIT, KSPS-1A and KSRF-2 for Only **$94.95**

Regular price if ordered separately $106.80

— CO-AX CABLES ARE NOT INCLUDED —

BE SECURE WITH BAMBI!

Bambi Now Provides Home/Industrial Security With The New ...

Automatic Sequential Scanning BEVS-1S

That's right! In addition to Bambi's regular features listed above, we have added Autoscanning with a controlled 1-10 second Varible Delay for up to six input security cameras.

The BEVS-1S allows simultaneous recording on a VCR while observing activity on the monitor. Manual lock-on of any one of six inputs can be accomplished at any time. The BEVS-1S coupled with our new Debbie CCTV-1 listed below makes an excellent security system for your Home or Business.

BEVS-1S Sequential Scanning Electronic Video Switch. . . **$199.95**

You Should Have Debbie's™ Quality!

Debbie CCTV-1
CLOSED CIRCUIT TELEVISION CAMERA

Excellent For Use In Home or Business Security Systems, Monitoring Production Lines, Childrens Play Areas, Etc.

Features:

- 2/3" Electrostatic Focusing Vidicon Tube
- EIA 525 Line, 60 Fields Per Sec. Scanning System
- 600 Line at Center Horizontal Resolution
- 1 Footcandle Minimum Illumination
- 10,000 to 1 Automatic Light Control Range
- 1.0Vpp Composite, Negative Sync, 75 Ohm Video Output
- 40dB Signal to Noise Ratio
- Standard "C" Lens Mount
- 110V ±10%, 50-60Hz, 9 Watts

Debbie CCTV-1 Requires C-Mount Lens **$159.95**

16mm, F1.6 Hi-Resolution Lens w/Cap **19.95**

Mounting Bracket Flexible, Locking, 360° Gooseneck for use in ceiling or wall mounting **12.95**

NOTE: When using the Debbie CCTV-1 with Bambi BEVS-1S, an RF Modulator such as our Model MPS-1 is required.

MODEL IC-1 INFRARED CONVERTER

Adapts to any video camera. Reduces energy costs for night viewing by 60%. Video tape in the dark without being detected. Excellent for • Factory Grounds Security • Home Surveillance. **Write for Details.**

★ **PWD** FOR DETAILS SEE OUR PAST ADS ★ **SPECIAL $109.95**

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— VISA and Mastercard Acceptable —

*Check orders will be held 30 days before shipping.

1983 160 S.S.B. Contest
High-Claimed Scores

Single Opr.

VE3CVX	158,580	W9YYG	56,487
WB3GCG	128,652	W8FGA	54,498
W9ZRX	108,928	W8GIO	53,534
WB8JBM	108,768	VE7CRU	53,500
KC8JH	91,512	W4TMR	51,250
VE3INQ	75,708	NØDQS	47,300
KØHA	71,688	K7VIC	46,626
KB8LH	69,597	K6HNZ	46,032
AA4VK	69,030	N8ATR	39,730
AB1A	68,244	K2EK	38,465
K1IK	67,456	W4MAF	38,222
W3TS	67,374	NQ4C	37,688
WA2SPL	67,237	AF1T	33,099
AD8I	66,154	YT3W	32,768
W4ZWE	64,612	YV3AZC	31,968
KD4NI	61,435	AA4MM	31,130
N5DD	60,378		

Multi-Opr.

OK3KFO	138,130	KK9A	60,966
ABØI	96,642	K8US	53,954
K1FFK	75,701	OK1KSO	50,520
KO9Q	73,416	WA6OCV	41,580
W9AZ	71,991	N8AKY	40,647
WA5WKO	70,354	NE4G	39,650
VE3ABG	66,015	K3YTL	38,420
N4DBR	62,593		

SEANET DX Contest

C.W.: July 16–17 S.S.B.: Aug. 13–14
0001 GMT Sat. to 2359 GMT Sun.

The aim of this contest is to publicize the hosting of the 12th SEANET Convention in November. (The NET meets daily at 1200Z on 14320 MHz.)

The same station may be worked only once per band. Cross-band or cross-mode contacts are not allowed, and multi-stations are limited to one signal at the same time.

Classes: Single operator, single and all band, multi-operator, all band.

Exchange: RS(T) plus a 3 figure QSO number starting with 001.

Scoring: For stations outside SEANET area.

(a) Contacts with stations within the NET area with the following prefixes: DU, HS, YB, 9V1, 9M2, 9M6, 9M8. Twenty points if on 160; 10 points if on 80 or 40; and 4 points if on 20, 15, or 10 meters.

(b) Contacts with stations in other NET areas: 10 points on 160; 5 points on 80 and 40; and 2 points if on 20, 15, or 10.

(c) Contacts between stations outside the NET area have no value.

(d) A multiplier of 3 points for each NET country worked.

Final Score: Total QSO points from all bands times the sum of the multiplier points.

Awards: Commemorative certificates to all qualified entries. Trophies to top scorers wil be presented at the SEANET Convention the weekend of November 18–20 in Singapore.

The usual disqualification rules will be observed and strictly enforced.

All entries must be received by October 31st and go to "Eshee," 9M2FK, P.O. Box 13, Penang, Malaysia. Include one IRC for a copy of the results.

For The Beginning And Advanced DXer!

Computerize your DX with *The Dx-Pediter!* For the Apple computer (on disc). Comprehensive log for DXCC award. Price: $29.95 plus $2.00 s & h.

Confused about DX? Try *The Complete Idiot's Guide to DX!* Learn the secrets that the folks who have 200 or more countries confirmed know. Price: $9.95 plus $2.50 s & h.

Tired of looking for beam headings on computer printouts? Then *The 2nd Op* is the answer to your prayers! Price: $6.95 plus $1.25 s & h.

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CIRCLE 60 ON READER SERVICE CARD

Colombian Contest

Starts: 1800 UTC Saturday, July 16
Ends: 1800 UTC Sunday, July 17

This year's contest will commemorate the 173rd anniversary of Colombia's independence.

Exchange will be on a world-wide basis, all bands 1.8 through 28 MHz, both phone and c.w.

There are four classifications: Single operator, single and all band, and multi-operator both single transmitter and multi-transmitter.

Exchange: Non-HK's—RS(T) plus a 3 figure QSO number starting with 001.

HK's—RS(T) plus number 173 (indicating the years of independence).

Scoring: Non-HK's—QSO with HK stations, 10 points. With other DX stations, 3 points. With stations in the same country, 1 point.

HK's—QSO with DX stations, 5 points. With other HK's 1 point.

Multiplier: Number of DXCC countries worked on each band.

Final Score: Sum of QSO points from all bands multiplied by the sum of different countries worked on each band.

Awards: A silver cup to the overall world winner, and 8 silver plaques for 1st and 2nd place in each of the four classes mentioned above. No mention was made of any certificates, but it is assumed that they will be issued for each country.

A minimum of 100 QSO's must be shown when applying for an award. Only one contact per band with the same station, and no cross band or cross mode.

Use a separate log sheet for each band, indicate the country only the first time it is worked, and include a summary sheet showing the scoring, etc. The usual disqualification rules will be enforced.

Mailing deadline is August 30th to: L.C.R.A., Contest Manager, Apartado 584, Bogota, Colombia.

County Hunters C.W. Contest

Starts: 0000Z Saturday, July 30
Ends: 0200Z Monday, Aug. 1

The County Hunters invite and encourage mobile and portable operation from the less active countries during this contest.

The same station may be worked on each band for QSO points. Portables and mobiles changing counties may also have repeat contacts. Stations on county lines exchange only one number, but each county is counted as a multiplier.

Exchange: QSO no., category (P—portable or M—mobile) RST, state, province or country, and county for U.S. stations.

Scoring: QSOs with a fixed station 1 point, 3 points if it's a portable or mobile. Multiply total QSO points by number of U.S. counties worked. Mobiles and portables calculate their scores for contacts made within a state.

VK/ZL/Oceania Contest 1982 Results

C.W. U.S.A.		Phone U.S.A.	
*KF1Z	8,280	*W1BIL	2,046
WA1FCN	816	*N2LT	1,880
W1END	420	KC2X	710
*N2LT	4,205	W2KZE	84
K2SX	1,694	*N4MM	1,176
KW2J	572	W4WIJ	1,088
KC2X	336	*N5HH	6,868
*W3ICM	243	*K6BPY	10,676
WA3DMH	203	W6UA	3,216
*AG5C	2,756	KA6CZS	64
W5PWG	1,200	*W7QK	1,680
*W6UA	8,132	KO7G	1,392
AA6EE	1,764	W7PQE	216
N6ZZ	1,474	*W8UVC	5,797
AI6Z	1,407	K8VIR	860
*W7QK	2,900	W8VEN	217
KA7FEF	456	*W0KEA	27,552
K7SS	160		
W7DRA	2	**Canada**	
*W8UVZ	930	*VE4RP	3,595
*WA9TZE	50	VE1YX	600
*W0KEA	12,257	VE3FEA	280

Certificate winners.

Canada

*VE3VC	3,360
VE4MF	702

Frequencies: 3575, 7055, 14065, 21065, 28065. It is requested that P or M stations use frequencies below 7055 and 14070; others spread out above.

Awards: Certificates in three divisions.

F—Top fixed or fixed portable in each state, province, or county with 1000 or more points.

P—Top score in each state by a portable operating from a county other than its normal location with 1000 or more points.

M—Top scoring mobile in each state operating from 3 or more counties, with a minimum of 10 QSOs in at least 3 counties.

There are also trophies for the single operator Portable and Mobile in the U.S. Additional awards will be made where deemed appropriate.

Stations with 100 or more contacts must include a check sheet of counties worked. Enclose a large s.a.s.e. if results are desired.

Mailing deadline is Sept. 3rd to: CW County Hunters Net, c/o Jerry Burkhead, N6QA, 7525 Baltic St., San Diego, CA 92111.

"Armadillo Run" Contest

0000Z Sat. July 30 to 0200Z Mon., Aug. 1

The Texas DX Society has scheduled this activity at the same time as the County Hunters C.W. Contest, the intent being to assist the County Hunters by activating all Texas counties. Teams of mobiles will activate counties where there is no fixed or portable operation—quite a project when you consider there are 254 counties in the state.

Exchange: The same as that used by the County Hunters Contest.

Scoring: The total number of Texas counties contacted during the contest period. Ties will be broken by the Texas QSO count.

Frequencies: On c.w. only, of course. Mobiles will generally be active during daylight hours and will be found at 14055–14075 MHz. Check the County Hunters contest rules for activity on other bands.

Awards: Certificates to all entrants contacting at least 50 or more Texas counties. There are endorsements for the following county levels: 100, 150, 175, 200, 225, and 250.

A plaque to the top scorer, who will be flown to Houston for the 1983 ARRL National Convention to receive his award (must contact over 175 counties).

Your log for the above awards must show Texas stations worked, time in UTC, band, and the county the station was operating from.

Send it to: Armadillo Run Chairman, Dennis Motschenbacker, KZ5M, P.O. Box 82, Thompsons, TX 77481. Mailing deadline is August 31st. QSL cards for Texas QSO's made during the contest period may also be sent to KZ5M.

European WAEDC Contest 1982 C.W. Results

U.S.A.			
*W1ZM	1,112,889	K8EF	12,600
*KC1F	1,034,838	W6BYH	11,256
*KQ2M	603,885	W1CNU	9,504
*KR2Q	539,648	N5EKX	7,808
*K1RX	508,392	KE6PQ	7,672
*W3GM	502,067	K6KWN	7,378
*N8II	486,890	W2XQ	7,154
*K2LE/1	467,274	WA3DMH	7,140
*K9DX	423,550	W1OPJ	6,666
*K1XM	368,550	KT5Q	6,363
*N4SA	354,598	W9PNE	5,640
*N6AR	305,492	KC7V	5,292
*N6AW	260,043	W5PWC	4,818
*N5JB	246,280	N5CFU	4,704
K5NW	241,012	NG6W	4,368
NW4I	219,965	W4KMS	3,550
*K5KLA	217,664	W9QWM	2,890
*K7IR	214,804	W5EIJ	1,856
*K7NHV	209,340	W4DGJ	1,600
K3FN	196,875	W5NR	1,598
*K4BAI	192,604	N3KR	1,430
AB2E	179,850	W4MLA/m	1,110
K9BG	178,062	W1BET	960
AA2Z	156,910	WA3JXW	572
N2LT	154,008	AA6EE	384
K4YKZ	116,655	N6RJ	360
*N8BC	110,220	N4MM	264
K1ZZ	92,826	**Multi-Op.**	
W4BV	91,368	*N4RJ	338,457
*W3AKD	81,220	*N5AU	324,159
*K9TUS	80,625	*W6BIP	162,573
NE4F	69,642	*WB2QEU	30,135
KA2MRP	69,158	*K0MIC	16,100
K2QF	62,140		
*N6ZX/7	58,242	**Canada**	
W3ARK	38,164	*VE1FH	422,870
*DJ6LK/W4	29,164	*VO1AW	192,775
K3CR	27,918	VO1CA	27,927
N6ZZ	27,692	*VE3DAP	14,700
KW2J	24,252		
N3GB	24,024	**Multi-Op.**	
W9RE	23,504	*VE2HQ	941,951
W3BGN	23,214		
K4FPF	22,932	**Continental Winners**	
*WB1EIL	21,424	Europe	DK3GI
W4KO	21,276	Africa	TU2IE
W9AG	21,240	Asia	UF6CR
K6NA	18,164	N. Amer.	W1ZM
N2MA/3	16,146	S. Amer.	LU1EIE
*W1YNE	14,592	Oceania	VK2APK
K1CC	13,936	*Certificate winners.*	
KA1GHR	13,940		

Illinois QSO Party

1800Z Sat. Aug. 6 to 0500Z Sun. Aug. 7
1200Z Sun. Aug. 7 to 2300Z Sun. Aug. 7

This is the 21st annual party sponsored by the Radio Amateur Megacycle Society. The same station may be worked on each band and each mode.

Exchange: RS(T) and QTH. County for Illinois stations; state, province, or country for others.

Scoring: One point per each QSO; 2 points if it's with a Novice or Technician.

Illinois stations multiply total QSO points by the sum of states (maximum 50), VE/VO call areas (maximum 10), and no more than 5 DX countries worked (maximum multiplier of 65). Additional DX contacts count for QSO points only.

Out-of-state stations multiply total Illinois QSO points by Illinois counties worked (maximum of 102).

Illinois mobiles and portables operating away from normal QTH may add 200 points to final score for each county of operation from which 10 or more QSOs were made.

There is a bonus for all stations: a multiplier of one for each group of 8 contacts with the same county.

Frequencies: C.W.—40 kHz up from low end of band. S.S.B.—3890, 7230, 14280, 21375, 28675. Novice—25 kHz from low end of each Novice band on the hour and half hour.

Awards: Certificates to the top scorers in the following categories: Single operator, multi-operator, both single and multi-transmitter, mobile, portable, Novice, and Technician. In each state, VE/VO province, DX country, and first 3 places in Illinois. Also club awards.

A summary sheet is requested showing the scoring and other essential information. Include a large s.a.s.e. for copy of the results. Mailing deadline is September 1st and entries go to: RAMS, Att: K9CJU, 3620 N. Oleander Ave., Chicago, IL 60634.

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CIRCLE 67 ON READER SERVICE CARD

Propagation

a monthly feature by
GEORGE JACOBS, W3ASK

THE SCIENCE OF PREDICTING RADIO CONDITIONS

The sunspot cycle has taken a nose dive! Mean solar activity for the month of February 1983, as reported by the Royal Observatory of Belgium, was 50.1. This was the lowest level to be recorded since January 1978. Activity increased slightly during March, with a mean number of 66.5 reported. These mean values result in 12-month running smoothed sunspot numbers of 109 and 101, centered on August and September 1982, respectively. This represents a drop of *14* points in the present solar cycle over a two-month period. A smooth sunspot number of 77 is forecast for July 1983, as the cycle continues its steady decline. Table I lists the monthly mean sunspot numbers reported by the Royal Observatory of Belgium for 1982. Table II shows the progress of Sunspot Cycle 21, which began during June 1976 and reached its peak during December 1979. The values shown are smoothed numbers rounded to the nearest whole number.

July Propagation

With the sun high in the northern sky during July, expect seasonal peak levels of solar absorption during the daylight hours. This means that all signals on all bands will be considerably weaker during the daytime. On the other hand, the intense ionization will cause a lingering effect into the evening hours, with higher frequencies available for DX openings.

Expect *20* meters to be the best band for DX for a period of several hours following local sunrise. Openings should be possible to most areas of the world during this period. Absorption will limit DX openings severely on *20* meters during midday, but by the late afternoon signal levels should improve, and the band should open again for DX. Fairly good worldwide openings should be possible during the daylight hours on *15* meters, particularly towards southern and tropical areas. Peak conditions are expected during the late afternoon hours. Conditions, however, should be considerably below those observed during other seasons. Some fairly good DX openings may also be possible on *10* meters, mainly towards southern and tropical areas, during the late afternoon hours.

As the sun begins to set, DX conditions should improve considerably. *Twenty* meters is expected to be the best band for DX openings during the hours of darkness. The band should open to most areas of the world, often with exceptionally high signal levels. Despite seasonally high static levels, good DX openings are forecast to many areas of the world on *40* meters during the hours of darkness and the sunrise period. While the high static levels are expected to hinder DX conditions on *80* meters, expect some fairly good openings during the hours of darkness. Not many DX openings are expected on *160* meters during July because of the intense solar absorption and the high static levels, but some may be possible to the Caribbean area during the hours of darkness. Be sure to also check the *15* meter band for DX openings towards the south and the west from after sundown to almost midnight.

Check last month's column for a comprehensive band-by-band DX propagation forecast for July. This month's column contains Short-Skip Charts for July and August 1983, and charts centered on Hawaii and Alaska.

Short-Skip Openings

July is generally the month in which sporadic-*E* ionization is most intense. This should result in a considerable increase in short-skip openings on almost all of the h.f. amateur bands, and on *6* and *2* meters as well.

Look for frequent short-skip openings on *10* and *15* meters between distances of 500 and 1300 miles. During the afternoon hours, skip may extend to beyond 2300 miles as a result of *F*-layer reflection. Short-skip openings should range between 250 and 2300 miles on the *20* meter band. Peak conditions are most likely to occur during the late morning and again during the late afternoon and early evening hours, but openings could be possible at just about any time. Daytime openings on *40* meters should range between approximately 100 and 600 miles, increasing to between 250 and 2300 miles after sundown. Look for openings up to about 300 miles on *80* meters during the daylight hours, extending out to the maximum short-skip (one-hop *F*-layer reflection) of 2300 miles during the hours of darkness. While no *160* meter ionospheric openings will be possible during the daylight hours of July, expect some openings between sunset and sunrise for distances up to approximately 1300 miles, and at times somewhat beyond this range. Seasonally high static levels will at times make reception difficult on *40*, *80*, and *160* meters.

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for July 1983

Propagation Index	Expected Signal Quality (4)	(3)	(2)	(1)
Above Normal: 3, 17, 30	A	A	B	C
High Normal: 2, 4, 8, 16, 18, 24, 29, 31	A	B	C	C-D
Low Normal: 1, 5, 7, 9, 13-15, 19-21, 23, 25, 27-28	A-B	B-C	C-D	D-E
Below Normal: 6, 10, 12, 22, 26	B-C	C-D	D-E	E
Disturbed: 11	C-E	D-E	E	E

Where expected signal quality is: **A—Excellent opening, exceptionally strong, steady signals greater than S9.**

B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find *propagation index* associated with particular band opening from Propagation Charts appearing on the following pages.

2. With the *propagation index*, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be good-to fair (B-C) on July 1st, good (B) on the 2nd, excellent (A) on the 3rd, good (B) on the 4th, etc.

Jan.	110.7	July	102.6
Feb.	162.6	Aug.	105.9
March	153.7	Sept.	119.2
April	122.5	Oct.	94.3
May	81.4	Nov.	98.5
June	110.4	Dec.	126.4

Table I– Monthly mean sunspot numbers reported for 1982.

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
1976						12	13	14	14	13	14	15
1977	17	18	20	22	24	26	29	33	39	46	52	57
1978	61	65	70	77	83	89	97	104	108	111	113	117
1979	124	131	137	141	147	153	155	155	156	158	162	165
1980	164	163	161	159	156	155	153	150	150	150	148	143
1981	140	142	143	143	143	142	140	141	143	142	139	138
1982	137	133	129	124	120	117	115*	109*	101*			

**Provisional, subject to slight change.*

Table II– Progress of sunspot Cycle 21.

11307 Clara Street, Silver Spring, MD 20902

Say You Saw It In CQ

HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distances column of a particular Meter band (10 through 160 Meters) as shown in the left hand column of the Chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate Meter band column (10 through 40 Meters) for a particular geographical region of the continental USA as shown in the left hand column of the Charts. An * indicates the best time to listen for 80 meter openings.

2. The *propagation index* is the number that appears in ( ) after the time of each predicted opening. On the Short-Skip Chart, where two numerals are shown within a single set of parenthesis, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of *days* during the month on which the opening is expected to take place, as follows:

(4) Opening should occurr on more than 22 days
(3) " " " between 14 and 22 days
(2) " " " between 7 and 13 days
(1) " " " on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual *dates* on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

3. Times shown in the Charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M. etc. On the Short-Skip Chart appropriate *daylight time* is used at the *path midpoint*. For example, on a circuit between Maine and Florida, the time shown would be EDT; on a circuit between N.Y. and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are HST. To convert to daylight time in other USA time zones, *add* 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone, and 6 hours in the EDT zone. *Add* 10 hours to covert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 15 or 3 P.M. in Los Angeles; 18 or 6 P.M. in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *daylight* time in other areas of the USA *subtract* 7 hours in the PDT zone; 6 hours in the MDT zone, 5 hours in the CDT zone and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 P.M. in N.Y.C.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts c.w. or 300 watts p.e.p. on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts c.w. or 1 kw p.e.p. on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave length above ground on 40 and 20 meters, and a wave-length above ground on 15 and 10 meters. For each 10 db gain above these reference levels, the *propagation index* will increase by one level for each 10dB loss, it will lower by one level.

5. Propagation data contained in the Charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Department of Commerce, Boulder, Colorado, 80302.

CQ Short-Skip Propagation Chart
July & August 1983
Local Daylight Savings Time At Path Mid-Point
(24-Hour Time System)

Band (Meters)	Distance Between Stations (Miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	08-10(0-1)* 10-14(0-3)* 14-18(0-1)* 18-22(0-2)* 22-08(0-1)*	08-10(1)* 10-14(3)* 14-18(1-2)* 18-22(2-3)* 22-08(1)*	08-10(1-0)* 10-14(3-1)* 14-18(2-1)* 18-20(3-2) 20-22(3-1)* 22-08(1-0)*
15	Nil	08-10(0-2)* 10-14(0-3)* 14-18(0-2)* 18-20(0-3)* 20-22(0-2)* 22-08(0-1)*	08-10(2)* 10-14(3)* 14-18(2)* 18-20(3)* 20-22(2)* 22-00(1-2)* 00-08(1)*	08-10(2) 10-14(3) 14-18(2-3) 18-20(3-4) 20-22(2-3) 22-00(2) 00-08(1-0)
20	10-01(0-1)*	07-10(0-2)* 10-18(1-4)* 18-22(1-3)* 22-00(1-2)* 00-07(0-1)*	07-10(2-4) 10-18(4) 18-22(3-4)* 22-00(2-4)* 00-02(1-3)* 02-07(1-2)*	08-10(4) 10-16(4-3) 16-00(4) 00-02(3) 02-07(2) 07-08(4-3)
40	08-10(2-4)* 10-15(3-4) 15-20(4) 20-22(2-4) 22-00(1-3) 00-08(1-2)*	08-10(4) 10-12(4-3) 12-17(4-2) 17-18(4-3) 18-22(4) 22-02(3-4) 02-05(2-4) 05-08(2-3)	09-10(4-1) 10-12(3-1) 12-17(2-1) 17-18(3-1) 18-21(4-3) 21-05(4) 05-06(3-4) 06-08(3) 08-09(4-2)	09-18(1-0) 18-19(3-0) 19-20(3-1) 20-21(3-2) 21-22(4-3) 22-06(4) 06-07(3-2) 07-08(3-1) 08-09(2-0)
80	06-12(4) 12-16(4-3) 16-00(4) 00-06(3-4)	07-08(4-2) 08-10(4-1) 10-12(4-0) 12-16(3-0) 16-18(4-1) 18-20(4-2) 20-22(4-3) 22-07(4)	07-08(2-1) 08-10(1-0) 10-16(0) 16-18(1-0) 18-19(2-0) 19-20(2-1) 20-21(3-1) 21-22(3-2) 22-05(4) 05-06(4-3) 06-07(4-2)	07-19(0) 19-20(1-0) 20-21(1-0) 21-22(2-1) 22-04(4-3) 04-05(4-2) 05-06(3-1) 06-07(2-1)
160	18-19(0-1) 19-20(1) 20-22(3-2) 22-00(4-3) 00-06(4) 06-08(3-2) 08-09(1) 09-10(1-0) 10-18(0)	19-20(1-0) 20-21(2-0) 21-22(2-1) 22-00(3-2) 00-04(4-2) 04-06(4-3) 06-08(2-1) 08-09(0-1) 09-19(0)	21-22(1) 22-01(2-1) 01-04(2) 04-06(3-2) 06-07(1) 07-08(1-0) 08-21(0)	21-23(1-0) 23-01(1) 01-06(2-1) 06-07(1-0) 07-21(0)

*Predominantly Sporadic-E Openings

HAWAII
July & August 1983
Openings Given in Hawaiian Standard Time

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	13-16(1)	06-09(1) 09-12(2) 12-16(3) 16-18(2) 18-20(1)	13-15(1) 15-17(2) 17-18(3) 18-22(4) 22-00(3) 00-02(2) 02-04(3) 04-06(2) 06-08(1)	18-20(1) 20-00(2) 00-02(1) 21-00(1)**
Central USA	12-14(1) 14-16(2) 16-17(1)	05-06(1) 06-12(2) 12-14(3) 14-16(4) 16-18(3) 18-20(2) 20-21(1)	06-08(2) 08-14(1) 14-16(2) 16-18(3) 18-00(4) 00-02(3) 02-04(4) 04-06(3)	20-21(1) 21-22(2) 22-01(3) 01-02(2) 02-03(1) 20-22(1)** 22-00(2)** 00-02(1)**
Western USA	10-12(1) 12-14(2) 14-18(3) 18-20(2) 20-21(1)	06-07(1) 07-08(2) 08-10(3) 10-18(4) 18-20(3) 20-22(2) 22-00(1)	05-08(4) 08-10(3) 10-13(2) 13-15(3) 15-22(4) 22-00(3) 00-05(2)	18-19(1) 19-20(2) 20-02(4) 02-04(3) 04-05(2) 05-06(1) 19-20(1)** 20-22(2)** 22-02(3)** 02-03(2)** 03-04(1)**

ALASKA
July & August 1983
Openings Given in GMT

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	Nil	21-00(1) 00-02(2) 02-03(1)	12-15(1) 22-00(1) 00-02(2) 02-04(3) 04-05(2) 05-06(1)	07-10(1)
Central USA	Nil	20-00(1) 00-03(2) 03-05(1)	13-16(1) 22-00(1) 00-03(2) 03-06(3) 06-07(2) 07-09(1)	08-12(1)
Western USA	01-04(1)	17-22(1) 22-00(2) 00-02(3) 02-04(4) 04-05(2) 05-06(1)	13-14(1) 14-15(2) 15-19(3) 19-01(2) 01-03(3) 03-06(4) 06-08(3) 08-09(2) 09-11(1)	07-09(1) 09-12(2) 12-13(1) 09-12(1)**

**Indicates best time for 80 Meter openings. Openings on 160 Meters are likely to occur during those times when 80 Meter openings are shown with a propagation index of (3).

#See explanation in "How To Use Short-Skip Charts" in the box at the beginning of this column.

Note: The Alaska and Hawaii Propagation Charts are intended for distances *greater* than 1300 miles. For shorter openings, use the preceding Short-Skip Propagation Chart.

V.H.F. Ionospheric Openings

Seasonally peak short-skip conditions are expected on both the *6* and *2* meter bands as a result of sporadic-*E* ionization during July. Openings on *6* meters are expected in the 600–1300 mile range, but could extend well beyond these distances. During periods of intense sporadic-*E* ionization, the skip may also be considerably shorter than 600 miles. During most sporadic-*E* openings, signal levels are expected to be exceptionally strong. Be sure to check the *2* meter band during intense sporadic-*E* ionization. As a rule of thumb, when the skip on *6* meters is shorter than 600 miles, there is a good chance that *2* meters will open over the same path. *Two* meter openings are likely to range in distance between approximately 1000 and 1300 miles. Sporadic-*E* openings can take place at any time, but they are more likely to occur for a few hours before noon and again during the late afternoon hours.

The *Delta Aquarids* meteor shower, which is scheduled to take place during the last four days of July, should permit some meteor-reflection-type openings on the v.h.f. bands. Approximately 20 meteors an hour are expected to enter the earth's atmosphere as the shower nears its peak on July 29th.

Some v.h.f. ionospheric openings may also be possible during July when radio storms occur. Auroral ionization, often associated with radio storminess, can produce unusual openings on both *6* and *2* meters for distances up to approximately 1300 miles. Check the Last Minute Forecast at the beginning of this column for the days in July that are expected to be Below Normal or Disturbed.

73, George, W3ASK

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CIRCLE 145 ON READER SERVICE CARD

DX

a monthly feature by
HUGH CASSIDY, WA6AUD

NEWS OF COMMUNICATIONS AROUND THE WORLD

Tell them I lingered alone on the shore,
When we parted, in sorrow, to meet nevermore;
The night-wind blew cold on my desolate heart;
But colder those wild words of doom,
"We're going QRT—"

Somewhere along the way most DXers lose some of their innocence. Often it comes when they first learn that DXers are not like other radio amateurs. In the late spring one of the QRPers came up the hill to talk of his new realization that the horizons of DXers are different from those of others. He quickly got to the point.

"Remember years back what the Old Timer said?" he asked, and we found ourselves nodding our heads, but not really sure why we did. "Which one?" we had to ask, for the Old Timer along the way has said many memorable things, all of which we tend to remember.

Certainly we remembered, for early on we ourselves had learned that DXers are different. They think differently, they operate differently, and there are those who say that they even look different. But when DXers meet with others, they do stand tall. But there had to be another reason for this QRP type to come up the hill, and we had to know more.

"Back a month or so ago there was a notice sent by a central radio group to call a meeting," the QRPer continued, "and the local radio club wanted someone to attend. Always wanting to see what might be on the other side of the hill, I told them that I'd be willing to go. It was a meeting called about the 'no-code' license proposal. One thing for sure, those who came to the meeting were not in favor of anyone getting an amateur license without knowing some code. Even those who mainly work s.s.b. were against the idea. I wondered why s.s.b.ers would be so set against the proposal."

We thought that we might understand. Anyone who works only phone might find a lot of new neighbors should "no-code" license be allowed. We once had mentioned this to the Old Timer, and all he would say was, "Remember when only c.w. was permitted on 40 meters?" And though we are old and tired from wandering the DX bands, we had to admit that it took a bit of remembering to recall that far back. But we still had the QRPer on our hands.

77 Coleman Dr., San Rafael, CA 94901

On his most recent DXpedition/holiday, CQ magazine's National Advertising Manager and former President of the Long Island DX Association, Jack, W2LZX, was honored by a contingent of world reknown DXers in 4X land at the home of 4Z4TT. Seated from left to right are Arik, 4X6AG; Dov, 4Z4DX; Ahron, 4X4FQ; and Riki, 4X4NJ. Standing (also left to right) are Baruch, 4Z4TT; Jack, W2LZX/4X; and Ami, 4X4DK.

"Tell us more," we said, not that we thought that this one would need urging. He had come to talk, and talk he did.

"One of the fellows there," he continued, "apparently was an amateur for a long time. Someone said he was Extra Class but holding on to a 1×3 W6 call sign. At one of the breaks this fellow was saying that DXers are the trouble makers in amateur radio, always trying to work stations in other countries and lousing up the bands. He even challenged the DXers standing around to name one good thing that DXers do. What do you think?

Naturally we were aghast. "But what did you say?" we asked, hoping that this one had held the field. We learned quickly that he had.

The QRPer smiled. "Well, first I quoted that section of the FCC's preamble to Part 97 about the amateur being licensed because of his unique ability to foster international goodwill. I don't think that he had ever heard or read that part."

"So what did you tell him?" we asked, already hoping that he had come up with something scintillating, as most Dxers are able to do so easily.

The QRPer smiled. "All I did was tell him about my overseas DX friends. I told him about the time that a bunch of JA amateurs, six of them crammed into a subcompact, pulled up in front of the QTH just to say hello on their way to Dayton. And the time I called a UA3 in the *CQ* World-Wide DX text, and this station in Moscow came back to me by name and asked how my family and I were. Boy! If nothing else, that made me feel 8 feet tall. And I asked this critic if he had ever had an amateur out of Estonia on a visit to the states come to California carrying a bottle of Russian champagne for him. He had to admit that he had not. So what did I do? I told him that any DXer could tell him stories like that. That DXers are the true Internationalists of amateur radio. Maybe I might have been new to this sort of gathering, but I can tell you for sure that after listening to the Old Timer a couple of times, I came prepared. That's for sure!"

This one was a delight. A QRPer who had responded well. He was not a reticent one; this one had learned early to battle. We were sure that one day this one would be high in the DXCC totals with his call engraved on the Honor Roll. This one had learned that everyone has to fight sometime and that one has to be prepared to win. Win the first fight and you probably will never have to fight again; lose and you'll find yourself fighting forever.

"But that meeting you went to," we asked. "What did they talk about and what were the decisions?" Sometimes one can learn something about what is going on in amateur radio by noting how such meetings go. The QRPer shrugged.

"Oh, they were against a lot of things but mostly the 'no-code' license. Also, they want the new bands to be c.w. only; they demanded steps to end deliberate interference on 2 meters or anywhere else. Some said that just because a youngster likes video games, does not necessarily mean he'd be interested in amateur radio, that amateur radio is an old man's game, that there are too many creeps in amateur radio, and things like that." We noted that the longer the QRPer talked this time, the more a note of uncertainty crept into his voice. As his words slowed, our attention and curiosity rose. There was something yet unspoken, and we had to know.

"And . . ." we said, a note of urging in the tone. Most everything he had said before was expected, but there was something else.

"They also talked about phone-band expansions," he continued, picking up the thread of his report. "Someone with inside sources said it might well be that before long there will be expansions of the phone sub-bands on 10 and 15 meters. But everyone there was strong for c.w., even wanting only c.w. on the new bands, and they were just as strong for expansion of the present phone sub-bands. How do you figure that?"

Really, we did not. But we had long ago learned that the first on his feet usually is the one whose proposal is adopted. The

Say You Saw It In CQ

The WPX Program

Mixed

1046	WB0WAD	1049	DL9JJ
1047	KA0DIL	1050	K8MW
1048	OE9SLH		

S.S.B.

1580	I2KUW	1582	N4DRC
1581	EA3AZO	1583	Z21GJ

C.W.

2203	KU2X

Endorsements

Mixed: 450 WB0WAD, HA9RE, W6NLG. 500 WB0WAD, HA9RE. 550 K2POF, WB0WAD, HA9RE. 600 WB0WAD, HA9RE. 650 WB0WAD, HA9RE. 700 WB0WAD, HA9RE. 750 WB0WAD, HA9RE. 800 HA9RE, K5PR. 850 N7TT, HA9RE. 900 N7TT. 950 N7TT, CT1LN. 1000 N7TT, CT1LN, 1050 N7TT, CT1LN. 1100 N7TT. 1150 N6JM, N7TT. 1200 N7TT. 1250 N7TT.

S.S.B.: 350 N7TT, EA4AZO. 400 N7TT. 450 K3IXD, N7TT, G4GED. 500 CT4NH, K3IXD, N7TT. 550 K8ZZU, CT4NH, K3IXD, N7TT. 600 CT4NH, K3IXD, N7TT. 650 CT2NH, N7TT, I0SGF. 700 CT4NH, N7TT, I0SGF. 750 CT4NH, N7TT. 800 N7TT. 850 N7TT. 900 N7TT. 950 N7TT. 1000 WF4V, N7TT. 1050 WF4V. 1550 I8KDB.

C.W.: 400 AC6H. 500 KA7AIG. 700 N7TT, AG5C, DL1AM. 750 AK9Z, N7TT, DL1AM. 800 N7TT, DL1AM. 850 N7TT, KL7AF, DL1AM. 900 N7TT. 950 N7TT. 1000 DL7MQ. 1700 WA2HZR.

10 meters:	N7TT, W5UR.
15 meters:	N7TT, SM4-3434.
20 meters:	N7TT, K2POF.
40 meters:	N7TT, KC8JH, N6JM, DJ1YH, NN4Q.
80 meters:	N7TT, NN4Q.
Asia:	N7TT.
Africa:	N7TT, JA2KVD, NN4Q.
Europe:	N7TT.
So. America:	N7TT.
No. America:	N7TT, WA6VJP.

VPX Endorsement for 850: SM4-3434.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if air-mail desired) to CQ WPX Awards, P.O. Box 1351, Torrance, CA 90505-0351 U.S.A.

question can be carried even though it might be inconsistent with what has gone before. The script was familiar, but somehow the feeling persisted that the QRPer had not run the full course.

"Anything else?" we prompted and got a puzzled look from the QRPer.

"Actually, there is," he said, "and it is something that kept coming up in the talks on the 'no-code' license. A lot of those speaking kept repeating that any 'no-code' license, if ever adopted, should be restricted to 900 MHz and above. Or was it 900 GHz and above? Anyhow, more than one on the floor speaking on the proposal kept mentioning that frequency." The QRPer was really furrowing his brow at this point. "I did hear them, but I didn't understand what they were talking about. Just what is the 900 MHz band and what goes on there?"

We could do little but laugh at this point, for it was evident that this DXer had not yet completely lost his innocence. We slapped him on his shoulder and tried hard to maintain a dignified appearance.

"You keep away from 900 MHz," we said. "No DX is ever found up there. It's where the DX ain't." For that's the way it has always been and that's the way it probably always will be.

Phone Band Expansion

If you have heard it elsewhere, it is interesting perhaps but not news. However, if you are waiting for the true word, the FCC approved the expansion of the U.S. phone sub-band on 20 meters. The whole thing was effective at 0001Z on May 22nd.

Jiro Iseya, JH4PRU, a junior high school teacher, holds his second daughter, Mika, in the shack in downtown Hira, Yamaguchi. Jiro holds a 10 meter WAZ, WPX, DXCC, DUF, and a few more. However, he's looking for more, being noted in Hira for the biggest aluminum cloud west of Osaka. Jiro has everything from 160 to 430 MHz, complete with a work basket up there to relax in and think DX.

The new boundaries for phone operation on 20 are: 14150–14175 kHz, Extra Class only; 14175–14225 kHz, Advanced and Extra Class; 14225–14350 kHz, General, Advanced, and Extra. This has been an item of discussion with the Extra Class some years back authorized to operate down to 14175 kHz; now their lower boundary is 14150 kHz. If your memory is dim, it might be noted that years back the top license class had few if any privileges, and with the incentive licensing of the mid-sixties, things started to change.

Elsewhere there was a veiled reference to possible expansion of the phone band in another area, specifically on 15 and 10 meters. Expansion of the phone sub-band on 15 has been noted by some close to the action as a good possibility, with expansion on 10 a subject for consideration in the future.

Every time there is an expansion of the U.S. phone sub-bands, there are loud cries of distress from some in other countries who oppose any change. Years back the argument was that there were many W/K's and few other amateurs in other countries. Then the JA's got their totals up, but mention this and you will be told that "they are different."

Anyhow, on May 22nd it came. And, as one old DXer has been heard to say, "If 20 comes, can 15 be far behind?"

Malpelo

It has been a long time since Malpelo, west of the Panama Canal towards the Galapagos, was heard on the amateur bands, but there are signs that you will hear it again this fall. Some speculation came with the possibility that the Colombians would put the HK0 station on the air during the 50th Anniversary of the Radio Amateur Colombian League (LCRA) celebration. Then there was speculation that the June meeting of Region II of the IARU would spark the big effort. But the late word is that it probably will be later this year, October at the earliest and more likely November. HK0TU will be the callsign, and you can check the late chart on this one by watching the DX bulletins such as "QRX DX" (K5NW), "DX Report" (VE3FRA), "Westlink" (WA6ITF), or "DX News" (G3XTT and G3ZAY).

Previous operations have been under the guidance of LCRA with the Colombian Navy providing transportation and support. At first glance it may appear to be an easy place to get to; it is, but the landing is a tough haul. Then after they get there it is tough to work some portions of the country. Some with high DXCC totals are still looking after suffering through a number of previous efforts.

160 Bulletin

N7CKD is working on a 160 bulletin, that vineyard that W1BB tilled so well for

The WAZ Program

10 Meter Phone

240	KB6OK	242	JE3BIQ
241	AB6R		

15 Meter Phone

159	JA2KSI	160	AB6R

20 Meter Phone

447	AE6Y

10 Meter C.W.

45	K4XO

15 Meter C.W.

88	JE3SAE	89	K4UEE

20 Meter C.W.

190	W6OKX	191	K8CX

All Band WAZ

S.S.B.

2641	JM1XSA	2651	I8HZT
2642	EA5ANR	2652	EA5BCX
2643	W3HAZ	2653	K8KJO
2644	AE6Y	2654	LX1FJ
2645	W5ADH	2655	N1ALR
2646	W7FJE	2656	K5OR
2647	HK3YH	2657	N9CPW
2648	KP4AAQ	2658	YC2BSF
2649	W6GYM	2659	KB7TW
2650	N8BIB		

C.W. and Phone

5544	W0BX	5554	N8BIB
5545	JA0AA	5555	W5XC
5546	VE3KOY	5556	HC4JL
5547	K8NA	5557	W4FNS
5548	ON6HW	5558	W6GYM
5549	JA7CTU	5559	W4MAF
5550	SM4EMO	5560	PY4KB
5551	K1XA	5561	JJ1RZG
5552	EA3AQS	5562	K1GW
5553	KP4V		

All Phone

584	DJ4YH

Applications and reprints of the latest rules may be obtained by sending a self addressed stamped envelope (37 cents) size 4½ × 9½ to the W A Z Manager, Leo Haijsman, W4KA, 1044 S.E. 43 Street, Cape Coral, Florida 33904. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all C.Q. awards is $4.00 for subscribers and $10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest *CQ* mailing label with your application.

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5AR4	4.73
5C22	165.00
5R4GB	3.85
6AK5	4.26
6AL5	2.93
6AQ5	2.85
6CA7	5.61
6DJ8	2.75
6JG6A	6.56
6JS6C	6.05
6KD6	6.90
6L6GC	5.25
6KV6A	6.02
6LF6	7.19
6LQ6	6.83
6MJ6	7.28
12AT7	2.93
12AU7	2.63
12AX7A	2.64
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705A	10.00
811A	13.50
813	40.00
829B	40.00
832A	38.00
833A	185.00
866A	9.50
872A	24.00
M-2057	15.00
5670	4.40
5684	33.00
5687	4.00
5751	4.00
5814A	3.70
5879	5.75
5894	65.00
6005	5.25
6146B	7.50
6360	6.50
6528A	75.00
6550A	7.50
6883B	9.00
7360	12.25
7558	7.00
7591A	4.73
7868	3.75
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many years. As in a lot of other endeavors, knowledge make things work, and many who have found the lower band intriguing have been helped by efforts such as Stu's, pointing to where the action is.

KH8AC in downtown Fairfield, Conn., notes that in recent efforts few if any DX-peditions have provided 160 action. With the sunspot cycle sliding, the lower bands will wake up and will provide a lot of DX attention in the coming years. If you are interested in knowing more, drop N7CKD a line.

The Colvins

Lloyd and Iris Colvin returned to the states in early spring after completing their JY8KG operation from Amman. They were at the California International DX Convention in April and then went on to the Dayton Hamvention.

If you are wondering if the Colvins will again be heard from their multiple DX stops, rest easy. They do plan to head out again and they will be heard. Off and on over the last decade or two the Colvins have been turning up to supply a lot of DX counters, in some instances opening up new countries for DXCC counters. On the last outing, which lasted over 6 months, they made over 50K QSOs from DX spots, working all of the Arab countries except for Iraq and UAE, as well as some activity in the Red Sea and the Horn of Africa. This time out they worked Djibouti, Abu Ail, Qatar, Oman, Saudi Arabia, Jordan, and Kuwait.

Dick Smith, VK7DIK

Last fall Dick Smith left Fort Worth in a Bell 206 helicopter to fly solo around the world. When you read this his schedule will have him over the Pacific, departing Tokyo June 22nd, arriving in Alaska June 28th, in Prince Rupert on July 7th, then via Seattle, Boise, Salt Lake City, Amarillo, and Dallas to the starting point at Ft. Worth; he is due to arrive there on July 22nd.

He will be operating a rig, and all flights are during daylight hours. He works upper s.s.b. only. Listen for Dick on this solo effort at 3797, 7225, 14146 or 14285, and 21385 or 21185 MHz. Dick has an attractive QSL and will supply one if you work him or report hearing him. Contact him at Box 321, North Ryde NSW 2113, Australia. The last leg from Sydney to Ft. Worth will be rough, and he will be in the air about 116 flying hours covering 12,727 nautical miles.

Djibouti Radio Assn.

The new address of the Amateur Radio Assn. Djibouti is POB 1076, Djibouti, Djibouti Republic, East Africa. This is the address for their QSL bureau, for the J2 Award, and for any other pressing business. Officers of the ARAD are J28AP President, J28BG Vice-pres.; J28DN Treasurer, J28DQ Secretary, and J28 QSL and Awards Manager.

The J2 Award comes in two sizes. All QSOs must be after June 27, 1977. QSOs with special calls such as J27RDD,

5 Band WAZ

Standings as of April 1, 1983

All 200 zones worked:

1. ON4UN, John Devoidere (Belgium)
2. K4MQG, Gary Dixon (U.S.A.)
3. SM4CAN, Kent Svensson (Sweden)
4. AA6AA, Steve Orland (U.S.A.)
5. W8AH, Albert Hix (U.S.A.)
6. W6KUT, E. A. Andress (U.S.A.)
7. EA8AK, Fernando Fernandez (Spain)
8. LA7JO, Stig Lindblom (Norway)
9. EA3SF, Fernando Blenert (Spain)
10. OH1XX, Hannu Nieminen (Finland)
11. EA8OZ, Julio Rosello (Spain)
12. W0SD, Edward Gray (U.S.A.)
13. K0ZZ, Gary Knutson (U.S.A.)
14. ON6OS, P. Michiels (Belgium)
15. OK3TCA, E. Melcer (Czech.)
16. K6SSS, Fred Capossela (U.S.A.)
17. ZL3GQ, Peter W. Watson (New Zealand)
18. OK3CGP, Stefan Melcer (Czech.)
19. SM0AJU, Leif Lundin (Sweden)
20. OZ3PZ, Preben Thomsen (Denmark)
21. I3MAU, Reno Mauri (Italy)
22. I2ZGC, Gianni Zillio (Italy)
23. 4Z4DX, Dov Gavish (Israel)
24. N4KE, Ron Blake (U.S.A.)
25. K5UR, Rick Roderick (U.S.A.)
26. K9AJ, Michael McGirr (U.S.A.)
27. SM3EVR, Tord E. Julander (Sweden)
28. LA5YJ, Bjorn Hugo Ark (Norway)
29. DL3RK, Walter Geyrhalter (W. Germany)
30. N4WJ, Frank McCormick (U.S.A.)
31. G3MCS, W.R. Hawthorne (England)
32. SM5AQD, Hakan "Hawk" Eriksson (Sweden)
33. W0MLY, George McKercher (U.S.A.)
34. I0RIZ, Gianni Rizzi (Italy)
35. ON5NT, Ghislain Penny (Belgium)
36. OH6JW, Antti Kiviuoma (Finland)
37. OK1AWZ, Milan Dlabac (Czech.)
38. IV3PRK, Pierluigi "Luis" Mansutti (Italy)
39. DJ6RX, Klaus Heintzenberg (W. Germany)
40. OH3YI, Ossi Lehvas (Finland)
41. I4RYC, Relli Claudio (Italy)
42. ZL1BIL, Mike Edwards (New Zealand)
43. I4EAT, Fausto Minardi (Italy)
44. ZL1BQD, R.J. Runciman (New Zealand)
45. TG9NX, Francisco Capuano (Guatemala)
46. XE1J, Joe Levy (Mexico)
47. F5VU, Jean Brunner (France)
48. W3AP, Norwood Lowry (U.S.A.)
49. YO3AC, Andrei Giurgea (Romania)
50. K3TW, Tom Warren (U.S.A.)
51. XE1OX, Elicio Munoz (Mexico)
52. VE7IG, Reg Beck (Canada)
53. OK1ADM, Vaclav Vsetecka (Czech.)
54. CT1FL, Carlos Viana (Portugal)
55. WA1AER, Raymond Sylvester (U.S.A.)
56. N4RR, Roger Hoffman (U.S.A.)
57. UW0MF, Mike Filippov (USSR)

The top 10 contenders for 5 Band WAZ:

1. JA3EMU, 199	6. EA8QL, 197
2. N4WW, 199	7. K1MEM, 197
3. W1NG, 199	8. K4CEB, 197
4. W8UVZ, 198	9. K7UR, 196
5. LA9GV, 198	10. F6DZU, 196

200 Stations have attained the 150 zone level

J2OD, or J2OZ are good counters. Class I you need 8 QSOs with J2 stations, any mode, but you must work them on at least two bands. Class II you need 15 J2's, all modes, but a minimum of 5 in c.w. and at least two bands. Send photocopy of QSLs along with list plus 8 IRCs to J28DM.

Baghdad

Don Riebhoff, K7ZZ, who is sometimes known as "Don of the Dunes," writes from Baghdad that although he has been a quasi-Silent Key in recent years, he has not lost the calling. He was last posted to Prague and is now in Baghdad. Recently Don was talking with Saad and Kamel of YI1BGD and passes along the following QSL information.

The best route for YI1BGD is with a self-addressed envelope and three IRCs (dated later than June 1961); it is absolutely necessary that the IRCs have been stamped with a post office validation stamp.

Things are not relaxed in Baghdad. The country is still in a long drawn-out war with a neighbor, and the amateurs operating YI1BGD are concerned with bootleggers using unauthorized YI calls such as YI1AS. Hints from official sources have been made that there could be another shut-down of amateur radio if the problem continues.

Don expects to be in Baghdad until mid-1984. but sees no chance of getting operating permission. He finds it a rest period after the hectic activity of other years when he was often heard with XV5 and XU1 calls. Anyone aware of what Don did in the past is confident that there again will be a day when he will be heard from some exotic spot.

Some Short DX Notes

Dave Novoa, KP4AM, says he still has the original logs for the 1979 KP4AM/ Desecheo operation. This one brought a new DXCC counter, and if you have a need for a Desecheo QSL, go direct to Dave at Box 50073, Levittown, Puerto Rico 00950. All you need is to be in the logs and send an s.a.s.e. with two IRCs, and the QSL for the first good Desecheo operation will be yours. Note that this is only for the Desecheo effort. If you want the plain KP4AM QSL, go to W7PHO. He has the franchise.

The Ministry of Communications at Tortola in the British Virgin Islands notes that you can get a reciprocal license for BVI if you hold a General/Advanced or Extra Class license. An annual license is $20 plus a 10¢ stamp duty, such licenses being valid until the 31st day of January in the year next succeeding the year of issue unless it is revoked for breach of the Telecommunications Act. Get your license after August 1st, and you need only pay half the fee. Send a notarized copy of your current license and a postal money order for $20.10 to the Accountant General, Ministry of Communications, Tortola, British Virgin Islands.

CQ DX Awards Program

S.S.B.

1234	VE2DRN	1240	YB0ACL
1235	N2ATD	1241	OZ8BZ
1236	WA8YTM	1242	N1ALR
1237	VE3MV	1243	WB2WEO
1238	I4LCK	1244	VE3JDO
1239	I2KUW		

C.W.

578	I5XIM	580	K6LEB
579	WB8OZX	581	JA7XBG

S.S.B. Endorsements

310	I4LCK/311	200	N1ALR/246
300	OZ8BZ/307	200	PY2DBU/226
275	N2ATD/288	150	YB0ACL/181
275	VE3MV/283	28 MHz	VE2DRN
275	W0ULU/276	28 MHz	WD0DMN
275	W4UNP/275	28 MHz	N1ALR
275	WA2SRM/275		

C.W. Endorsements

300	N6CW/308	275	SM6CST/286
300	K6LEB/301	150	WB8OZX/155
275	I5XIM/280		

Total number of active countries is 315. The basic award fee for subscribers to CQ is $4. For non-subscribers, it is $10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are $1.00. Updates not involving the issuance of a sticker are made free when an s.a.s.e. is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply. Please make all checks payable to the awards manager.

Speaking of the DX Test, they may be gone but they are long remembered. Gerhard, DF2RG, was the eighth place finisher for West Germany in the September 1981 phone outing. Some may think that it took all this time to work through N6AR and K3EST's valiant labors, but actually it was called to our attention by someone who checks these things closely — DF2RG, not DF2RS.

Several plans for S21/Bangladesh were announced early in the spring by JA groups and others, but some problems seemed to have put most of the action on hold. It is not that no one is trying, but there are other problems.

ZS1SG and ZS1BR have built a v.h.f. beacon transmitting continuously FSK at a crystal-controlled frequency of 50.945 MHz. The beacon transmits continuously signing ZS1SIX, changing to f.m. with a 1 kHz audio tone and constant carrier. Either mode is identified in the transmission, and they ask for a QSL to ZS1CT, POB 5100, Cape Town 8000, Republic of South Africa.

Jay and Jan O'Brien, W6GO and K6HHD, sometimes known widely for their QSL List, and sometimes known as DXers in areas far from their familiar skies, are mailing out the FO0OJ and FO0JO QSLs from their Polynesian trip of a few months back. They were scratching for cards from Delaware and North Dakota, trying to fill out a WAS from FO0-land.

Franz Langner, DJ9ZB, was at 3A3 WPX in Monaco for the *CQ* WPX Test in late March. There was a brief flurry of Heard activity after the two main efforts departed, the "Nella Dan" out of Aus-

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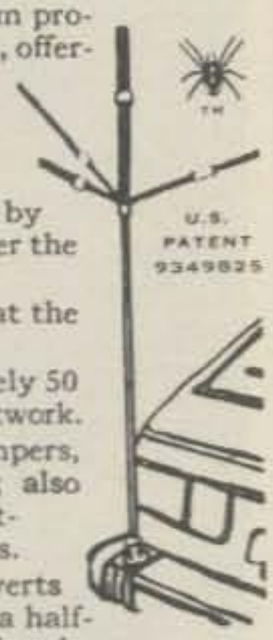

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C.W.

W6PT	315	K9MM	311	W9BW	304	K9QVB	298	SM6CST	286
DL7AA	314	N6AV	310	W4OEL	303	DJ7CX	297	W7CNL	283
ON4QX	314	K4CEB	310	W2GT	301	N4MM	297	WØSR	282
W3GRS	313	K6JG	310	WA8DXA	301	K1MEM	297	K8PYD	281
W9DWQ	313	N6CW	308	AA6AA	301	W6SN	295	K7ZR	280
W8KPL	313	W4BQY	307	K6LEB	301	WØIZ	292	I5XIM	280
K6EC	312	W1NG	306	SM3EVR	300	AB4H	291	W4BV	277
N4PN	312	DL3RK	306	K3FN	298	N5DX	291	WB4RUA	277
W6ID	311	K4XO	305	OK1MP	298	W1WLW	289	K4SE	275

S.S.B.

K2FL	315	K4MQG	311	AA6AA	303	K4SE	293	XE1OW	283
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K6WR	315	WØSFU	311	ZL1BIL	303	K9IW	293	VE3CKP	283
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F9RM	314	K9RF	310	VE3FJE	301	WA4DAN	291	TG9EP	281
VE3MR	314	N4MM	310	WB4NDX	301	KV2S	291	KB5FU	281
I8AA	314	VE3GCO	309	WA3HUP	301	VE3IPR	291	SM4CTT	281
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W4EEE	314	W2SUA	309	W8JXM	299	YU1DZ	290	KB3OQ	280
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I4ZSQ	313	K4XO	308	N5FG	299	KM6B	289	KA8T	279
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W3AZD	313	YV5AIP	308	K9SM	298	KB8DB	288	KB8O	277
ZS6LW	313	K6XP	308	K9HQM	298	I8KCI	288	KP4EQF	277
DJ9ZB	313	OK1MP	308	I8LEL	298	I5BDE	288	K1VHS	277
K6YRA	313	WØYDB	307	K8NA	298	N2ATD	288	WBØUFL	277
ZL1AGO	313	N2SS	307	W6DN	298	EA9IE	287	ACØA	277
VE2WY	312	VE4SK	307	W2CC	297	AB9E	287	K9TI	277
K6JG	312	K8PYD	307	HP1JC	297	KB9KD	287	W6NLG	277
F2MO	312	OZ8BZ	307	DJ7CX	297	KC8JH	287	N7ASL	276
K9MM	312	N4KE	306	K5DUT	297	WB4UBD	286	WØULU	276
W3GG	312	N6AV	306	JH1VRQ	297	W4BQY	286	I8INW	275
W4DPS	312	VK4VC	306	IØMBX	297	YU2RTW	285	JH4PRU	275
W9JT	312	4Z4DX	306	I8ACB	295	WD9IIX	285	W8LKG	275
N4WF	312	K1UO	306	WB1DQC	295	K8VFV	284	W4UNP	275
W9BW	312	YV5DFI	305	IV3YRN	295	NA5W	284	WB3CQN	275
I8YRK	312	W8ILC	305	K9UAA	295	WØKU	284	WB1EAZ	275
OZ3SK	312	N4PN	305	K9QVB	295	WB3HAZ	283	VE7BSM	275
K6EC	311	WØSR	304	WA9PWN	295	WB6GFJ	283	WA2SRM	275
W4SSU	311	9H4G	304	W1LQQ	294	VP9CP	283		
K9LKA	311	K9BWQ	304	XE1NI	294				

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tralia stopping briefly in late March to check the site, and VKØDA and VK7TM/Ø being on the air for about four hours. Willy de Roos, VK9XR, was back in the Antarctic this spring. It was turning winter in that part of the world, and a lot of the various research facilities were shutting down. But Willy was there with his vessel, the "Williwaw," and was reported in the Palmer Peninsula area. Some years back Willy was aiming to winter at Peter I island, some hoping that this would be a new country, but things did not fall into place. WB6ZUC, who visited that island on an Antarctic cruise ship a few years back, says she can understand why. Really tough! But that may not stop Willy, who single-handedly went through the Northwest Passage a few years back, wintering there in the Arctic.

The Western Pennsylvania DX Association recently elected officers for 1983. They are Alan Lefcort, WB3GPR, President; Bill Futrowsky, WB3JWJ, V. President; Wayne Albert, KB3KV, Secretary; Don McDaniel, KJ3Q, Treasurer; Myrven Caines, KA3CFR, DX Information Officer; Glenn Fertig, WB3AHI, Technical Officer; Stan Dicks, W8YA/3, Newsletter Editor.

QSL Information

Noting first, as many who work in the QSL Bureaus are often heard in chorus, "we don't belong to the regulars; we're only volunteers," we list one of the brave,

ready to volunteer for duty as a QSL Manager for a DX station. He is Brad Wells, KR7L, 5053 37th Avenue, Seattle, WA 98126.

Bob "Kappy" Kaplan, WA4WTG, 445 N.W. 202 Terrace, Miami, FL 33169, reports that he is the QSL Manager for FY7AE, J3ABG, LZ2JF, TJ1BF, ZF2GE, ZP5KS, 4Z4DX, 4Z4HF, 4Z4LF, 4X4NJ, 4X4UF, 4X4VB, 4X2BYB, 4X6BYB, 5Z4RH, 6Y5MC, 6Y5RL, 8P6AH, 8P6BN, 8P6IB, 8P0A, 9Y4E, P29RY.

Also, just a quick note that Slim has been reported in recent months at ET0US and VE4OY/8Z4.

On some prefixes, CY1–8 are the same as VE1–8, CY1–2 are VO1–2, and T42, etc., goes to Cuban bureau.

CR9T to WA4IKZ
CR9Z to JA1ELY
DK7PE/HB0 to DK7PE
DL1JW/HP1 to DL1KB
EK9D/0 to N8ACA
GJ5DSD to WA4WPO
HH2JR to KA5V
HH2CO to W4MBX
FO0JO to W6GO
FO0OJ to K6HHD
J28AZ to I8JN
J37XC to W2BJI
J87LTA to K4LTA
JW4GN to LA9VX
K1BJ/3B8 to K1BJ
K7NHV/VP2V to K7NHV
KP4AM to W7PHO
LU2MM to K1MM
PY0SA to DK9KX
PZ5JR to K3BYV
TR8JD to F6AJA
TI2BEV to W4ZD
V3HE to DL1JW
V3TV to G3ATK
V3X to WD0BCX
VK9YB to KB9UV
VK9YC to KB9UV
VP1BCX to WD0BCX
VP1X to WD0BCX
VP2EH to KC5EA
VP2ES to K8CW
VP2MDB to W2WSE
VP5KMX to WB9TIY
VP5SSX to KB9AW
VP5FUX to KB9AW
VR6KY to KC5GL '83 CB
W6YB/3D6 to KD7VD
Y83ANT to Y44YK
XT2BM to WD4RHL
YC1GJ to K2BGX
YU8DX to YU8IA
ZF2FL to N6RJ
4N9V to YU4CN
6T1YP to DF3NZ
3A3WPX to DJ9ZB
6Y5PG to VE3DOU
8P6J to 12/31/82 N6TR
8P6J from 1/1/83 WA6OTU
8Q7JA to HB9TL
9M7YY to K5YY
KP4AM/Desecheo to Dave Novoa, Bx 50073, Levittown, Puerto Rico 00950 (Desecheo only)
4X4JO to Israel Hamburg, 32-Sy-Agnon St. Bat-Yam 59556 Israel
EA9KQ to POB 21, Melilla, Spanish North Africa
P29JM to POB 9205, Rawa, Papua
TR8DC to POB 2125, Libreville, Gabon Republic
TT8AD to POB 815, Ndjamena, Chad
7P8CM to Private Bag A140, Maseru, Lesotho

73, Cass, WA6AUD

5B WAZ No. 49

A call that will quickly be recognized by most DXers is on 200-zone 5B WAZ #49, this going to Andrei Giurgea, YO3AC, in Bucharest, Romania. This is the first 5B WAZ to go to a Romanian station.

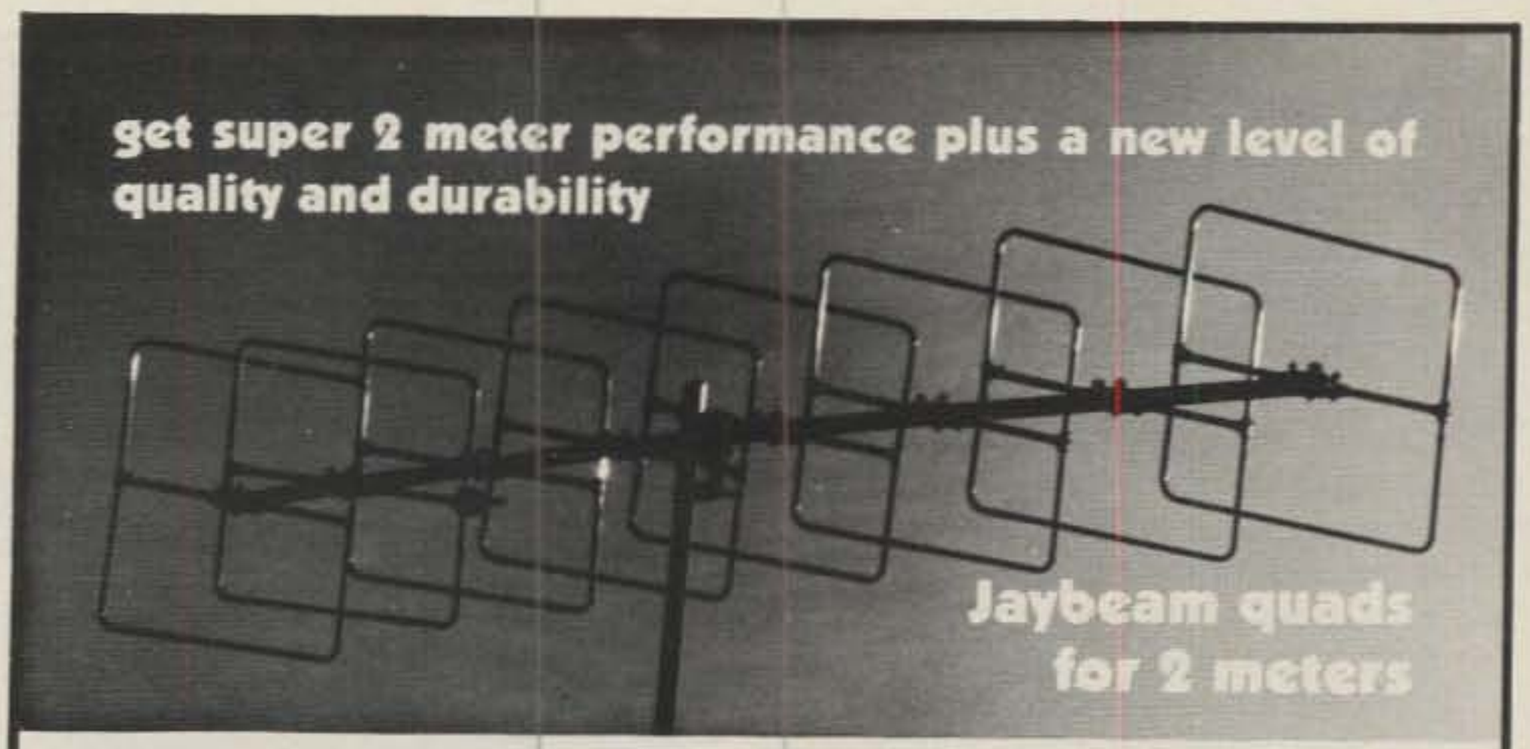
Andy was first licensed back in 1958 with the Romanian third class amateur license, and he worked through the classes until he attained the first class license in 1972. This allows operating on all bands with all modes and a maximum input of 400 watts. He was born in 1941, is a chemical engineer in rubber processing, and is connected with auto tire manufacturing. Married since 1963, there is a 13-year-old son, Vlad.

YO3AC also gained the first 5B DXCC in Romania, it being #247, and he is on the DXCC Honor Roll. He also gained the first Romanian CW DXCC and has WAS on RTTY. Within the YO-DX Club, he holds the largest total number of awards, this being 416 different awards, and he is second in countries in the club.

C.w. is his operating preference, though in recent years he has been working considerable RTTY. The antennas include an inverted Vee for 80, a dipole for 40, and a triband beam for 20, 15, and 10 meters. He runs a TS-520S with outboard v.f.o. and a homebrew linear. The RTTY is largely homebrew with a video display on the home TV set. Andy, besides the native language, speaks English, French, and German and is interested in history.

Eighty meters was the tough band to complete 5B WAZ, zones 1, 27, and 31 being the elusive ones. The beam for the v.h.f. work is a log periodic built by DJ2UT. It has three full-sized elements for 20 on a 12-foot boom, a matching element for 15, and a matching element for 10—no traps, the reflector being fed by the radiator for an f/b ratio of 25 dB. It has been in use for over 10 years.

YO3AC belongs to the Bucharesti City Radio Club and is also a member of the Executive Board of the Romanian Amateur Radio Federation. He is also the national emergency coordinator and the editor of the weekly QTC net on 3650 kHz. In other years a dedicated contest operator, high blood pressure recently has had his doctor telling him to knock it off!



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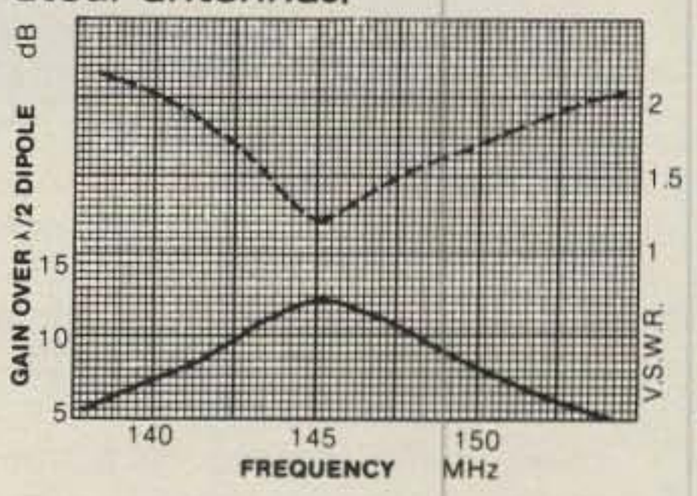

Q6/2M

KEY
V.S.W.R.
Gain over λ/2 Dipole

SPECIFICATIONS

	Q4	Q6	Q8
FREQUENCY (MHz)	144-148	144-148	144-148
GAIN dbd	9.4	10.9	11.9
FRONT TO BACK RATIO	20dB	22dB	25dB
3dB BEAMWIDTH	E48°	E40°	E37°
	H50°	H42°	H38°
BOOM LENGTH	4.92'	8.2'	11.6'
LONGEST ELEMENT	24.4"	24.4"	24.4"
TURNING RADIUS (APPROX)	2.6'	4.2'	5.87'
DESIGN IMPEDANCE	50 Ohms	50 Ohms	50 Ohms
POWER RATING (PEAK)	1 kw P.E.P.	1 kw P.E.P.	1 kw P.E.P
WINDLOADING AT 80MPH	30.8 lbs/f	45.1 lbs/f	61.6 lbs/f
WEIGHT	5.94 lbs	7.7 lbs	10.3 lbs.

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CQ REVIEWS:

BY DAVE INGRAM*, K4TWJ

The Yaesu FT-708R 70 cm (440 MHz) HT

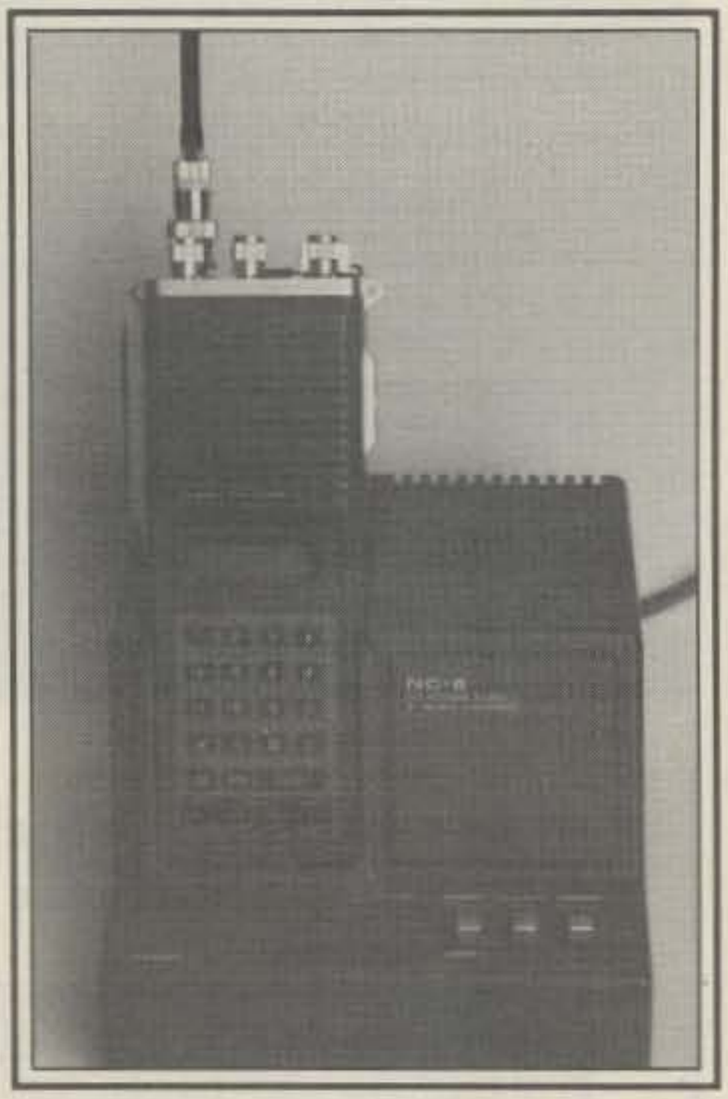
As we all know, f.m. activity on the v.h.f. and u.h.f. bands has become a craze of worldwide proportions. Likewise, an increasing number of amateurs are sporting at least one "sidearm talkie" for personal use through an area's array of repeaters. As the number of f.m. enthusiasts and repeaters expands throughout the continent(s), lower frequency bands (such as 2 meters) fill to capacity and necessitate progression to higher frequency bands (such as 70 cm). Other times, individual amateur groups desiring a more "public-restricted" range for conducting communications look to the u.h.f. bands. Both concepts hold true merit, especially during times of crisis or emergency—times when the 2 meter f.m. band is fully occupied with communications and additional or priority frequencies are needed. Waiting until the precise time for that need before implementing such a system, however, is quite illogical. This emphasizes the case for 70 cm f.m. rigs, and their most useful counterparts: hand-held talkies with touchtone® capabilities.

F.m. activity within the allocated portion of 70 cm bears a close resemblance to 2 meters. Communications range is roughly similar assuming reasonably flat terrain and miniscule amounts of foliage (which can soak up u.h.f. energy like a sponge). Repeaters are also similar in concept and use, often giving the impression of an "expanded 2 meter band," especially in large metropolitan areas.

FT-708R Overview

One of the most impressive 70 cm talkies I've seen is the FT-708R manufactured by Yaesu Electronics Corp. Possibly this impression is due to a long-time appreciation and enjoyment of the FT-208R 2 meter talkie, but its 70 cm "identical twin" has a collection of features which are hard to beat.

The FT-708R is frequency synthesized and microprocessor controlled with all frequency operations (except transmitter offset) being entered via a front-panel keyboard. The keyboard is also a two-tone encoder during transmit periods. In fact, this talkie operates exactly like the FT-208R except frequency coverage is 440.000 to 449.975 MHz, frequency stepping is 25 or 50 kHz (front-panel selectable), and the preset transmitter offsets are "standard": −5 MHz, simplex, and +5 MHz (different splits can also be programmed into memory). Ten programmable and lithium-battery-maintained memories are included; that battery's estimated lifespan is 5 years. The FT-708R uses the same NiCad battery pack as the FT-208R (Yaesu FNB-2), but its r.f. output is 1 watt (high) or 200 mw (low). The reduced transmit battery drain (500 ma/300 ma) thus produces longer operating time between charges.



The Yaesu FT-708R 70 cm hand-held talkie is a compact and outstanding unit featuring numerous "bells and whistles." The rig is shown sitting in its optional NC-8 power supply/charger.

The FT-708R's LCD readout is neatly recessed with very good visibility from almost any angle. A right-side pushbutton (opposite the push-to-talk button) activates a small light for nighttime viewing. Two LEDs are mounted above the frequency readout: one illuminates green when an on-frequency carrier is present, and the other illuminates red during transmit (a dim red LED thus indicates depleted NiCads). A front-panel switch can be used to inhibit the push-to-talk switch during periods of belt or coat-pocket monitoring.

Physically speaking, the FT-708R is well balanced and quite compact. The case is well fitted, and the unit's overall appearance is traditional. The metal framework around the sides and bottom effectively acts as a ground plane for snap-on antennas, producing a good mile-per-watt ratio. The BNC antenna connector can be used for both stubby and external antennas.

Bells and Whistles

As previously mentioned, the FT-708R is absolutely loaded with special features. Indeed, the flashing LEDs and beeping microprocessor almost give the talkie a personality of its own. Beeps occur whenever a frequency is entered, when a memory is recalled, or when its scanning function spots on-frequency activity. Stepping between frequencies or memories is accomplished by separate taps on **Up** or **Down** keys. Holding either of those buttons for one second initiates scanning (of band or memories, according to which is recalled for use at that time). Programmable band scan is also included (tune or delete any portion of 2 meters, as desired). The scanner is time actuated rather than carrier actuated, thus preventing continual "holding" by long-winded repeaters (a yak-proof talkie!). The unit's priority function can also be set to monitor one frequency while you're communicating on another frequency. When priority frequency activity is spotted, the talkie beeps, flashes its LED, and switches frequency.

If all this isn't enough, consider the FT-708R's optional FTS-32 subaudible tone encoder/decoder capabilities. When enabled (by a switch on the squelch pot), the talkie will silently monitor a busy repeater

*Route 11, Box 499, #1201 South, Birmingham, AL 35210

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continuously (there seems to be a direct relation between a repeater's coverage/importance and the number of nearby trivial experts). The only indication of "continuous rattling" is a green LED. Whenever someone "tones" your unit, however, the squelch breaks for you to join the action. If the squelch switch is left unchanged, that same subaudible tone is then added onto your transmission, permitting "toning" of another unit.

From this point you can add your own "frills"—maybe in the form of two-tone decoders on the home or auto transceiver. Through specific keyboard punches, you could then relay switch on outdoor lights and garage-door openers, crank the auto, etc., right from the talkie. A few NE567 circuits could handle these tasks.

Operating the FT-708R

The FT-708R is a true delight to use, primarily because of its human engineering and minimum keystroke operation. The green "carrier on frequency" LED is especially useful when mobiling during evening hours. With reduced talkie volume or stereo music (or an h.f. rig's audio!) filling the car, 2 meter calls could otherwise go unnoticed. The bright LED shining from a car seat, however, easily catches one's eye quite naturally. The beeping microprocessor is also great for "no eyes" scanning or tuning while mobiling in traffic.

Both transmit and receive audio quality of the FT-708R is crisp and clean—slightly higher pitched than the FT-208R, but not as high as an ICOM IC-2AT.

In addition to conventional top connectors for antenna, external speaker-mike, and earphone, botton connections are provided for drop-in charging, powering from an external 11.8 volt source, and 15-hour charging from the supplied wall charger. Surprisingly, schematics for these Yaesu accessories (NC-7 regular charger, NC-8 regular, rapid and trickle charger plus d.c. power supply, and the PA-3 mobile d.c. power supply plus NiCad charger) are included in the FT-708R manual. It doesn't take long to thus rig some rather spiffy extras "homebrew style." Our hats are off to Yaesu for their consideration of radio amateurs. That doesn't decrease their selling market, however; the Yaesu NC-7, NC-8, and PA-3 are attractively packaged and reasonably priced.

The FT-208R's multi-power capabilities are unique: you can use the unit all day as a portable and then put it on the auto's seat for mobiling. If the NiCad pack dies, simply plug the PA-3 supply into the talkie and auto cigarette-lighter socket. The unit then operates from the auto's battery. Meanwhile, a separate plug on the PA-3 recharges the NiCads.

The NC-8 Charger

This optional item adds a really neat touch to either the FT-708R or its 2 meter twin, the FT-208R (an XYL, WB4OEE, "direct quote"). First off, the charger is an attractive "HT holder" with an open area for accessing the tilted keypad (where do you lay your HT while you're home, eh?). Since two power supplies (and multiple bottom connectors) are included in the NC-8, you can independently power the talkie for continuous operating while recharging the NiCads. Pushbuttons select trickle, regular charging (15 hours), or rapid charge (4 hours). The unit automatically switches to trickle after full charge time is achieved. A very nice item!

Conclusion

The Yaesu FT-708R is a very outstanding 70 cm f.m. talkie. The trim little package of communications electronics boasts almost every conceivable operating feature, and the unit is supported by a wide range of readily available accessories. Those items include the previously mentioned NC-7 and NC-8 chargers, the FBA-2 battery-pack sleeve (for use with NC-7 or NC-8), the PA-3 mobile power supply and charger, the FNB-2 extra 10.8 volt NiCad pack, the MMB-10 mobile mounting bracket, the YM24A external speaker-mike, and the FTS-32 tone squelch board. As an extra benefit, all of those accessories are interchangeable between the FT-208R and the FT-708R. What other incentive could there be for joining 440 MHz action?

For more information on the FT-708R, contact Yaesu Electronics Corp., P.O. Box 49, Paramount, California 90723.

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World of Ideas

a monthly feature by
DAVE INGRAM, K4TWJ

A LOOK AT THE WORLD AROUND US

S.W.L.'ing Today: A New Game

There's a creditable number of very interesting transmissions and communications presently being conducted within the h.f. spectrum, and you can tune in this activity with the aid of a general-coverage receiver or a full-coverage transceiver. These activities range from drug runners and smugglers moving their goods to waiting contacts along coastal areas, to communications among specially formed mercenary groups and guerillas, modern-day soldiers of fortune and CIA/FBI agents chasing those underworld figures, plus aircraft hi-jackings and more—much more. Propaganda broadcasts, along with their typically experienced jamming operations, continue to pepper several international shortwave bands, while "Free Radio" stations and unidentified "numbers" stations can be spotted almost every week during their somewhat eclectic operations. How can you get a ringside seat to some of these underworld actions? Simply use the memory capabilities or digital frequency readout of a full-coverage receiver to monitor some of the "hotspots" mentioned in this month's column and proceed from there according to your particular area of interest.

Here are the basic ingredients for s.w.l.'ing today: the receiver of your choice and a few publications on specific areas of interest. Popular Communications *magazine is a sister publication of* CQ.

Remember the Falkland Island revolution a while back? Even before English ships arrived in that area, a modern-day Tokyo Rose took to the airwaves reminding British troops of their girlfriends or wives back home and relating thoughts of an "unwarranted battle." Radio Falklands also continued broadcasts depicting Argentine rule for several weeks after British takeover, although the origin of those transmissions was unknown.

Another interesting situation evolved during the recent surge of terrorist activities in El Salvador, and continues in progress as this column is being written. Anti-government transmissions from the clandestine Radio Venceremos on 6710 to 6730 kHz are being jammed by an unknown Latin music source. Almost a cat and mouse game, each tries small frequency jumps to accomplish their particular task. It's almost impossible to predict which one will eventually win out in this "QRM battle." Alternate Radio Venceremos transmissions on 6950 kHz have also experienced jamming by a "buzz saw" sound which clandestines claim eminates from U.S. ships in nearby waters. If you would like to check some of this activity for yourself, listen around the previously mentioned frequencies at 0000, 0100, 0230, and 0330 GMT daily.

Since most underworld transmissions/communications are especially dependent on secrecy and anonymity, "oddball" and often overlooked frequencies are the keynotes of operation. A few weeks ago, for example, we heard rumors of some high-level drug running activities culminating around a certain coastal area. A bit of close listening near maritime channels between 40 and 80 meters gave some interesting returns. Several vessels of unknown size, operation, identification, etc., were heard making plans for brief group meetings after midnight landings, which, incidentally, were continuously highlighted with a "no lights and brevity ashore" stipulation. A few MHz away, FBI/CIA frequencies were exceptionally quiet (popular FBI/CIA frequencies are 18,666, 11,076, and 7,527 kHz, the last one being the most active channel). Licensed activities? Get serious. What government would license such communications, and what groups would dare reveal such operations. Don't take these things wrong, however: radio amateurs are not the only good guys on the h.f. bands. The majority of shortwave transmissions and communications are quite conventional and legal in operation. You may need to do some educated digging to spot the underworld boys, but chances are good that you'll run across some of their shenanigans within a few night's time. It's merely a matter of defining your particular interest (there are so many things happening that it's impossible to keep up with everything!) and then investigating information relative to that area. Old-time DXers have employed that technique for many years, exchanging notes, studying specific interest magazines, monitoring specific frequencies, and so forth.

Realizing that the activities happening within the h.f. spectrum are extremely diverse, we will now briefly discuss some of these areas in a "no holds barred" manner. You can then draw your own conclusions on areas of investigation. There's quite a bit of ground to cover, so hold on to your hat as we zip along.

Underworld Communications

Scattered among select frequencies in the h.f. spectrum, these unusual activities are conducted by unidentified groups which seem to appear and disappear without sequence or predictability. The organized form of these operations tends to indicate internal planning among personal carriers with on-the-air coordinations when a particular move begins. Frequently used underworld "hot spots" are as follows: undercover—13,560, 6,522,

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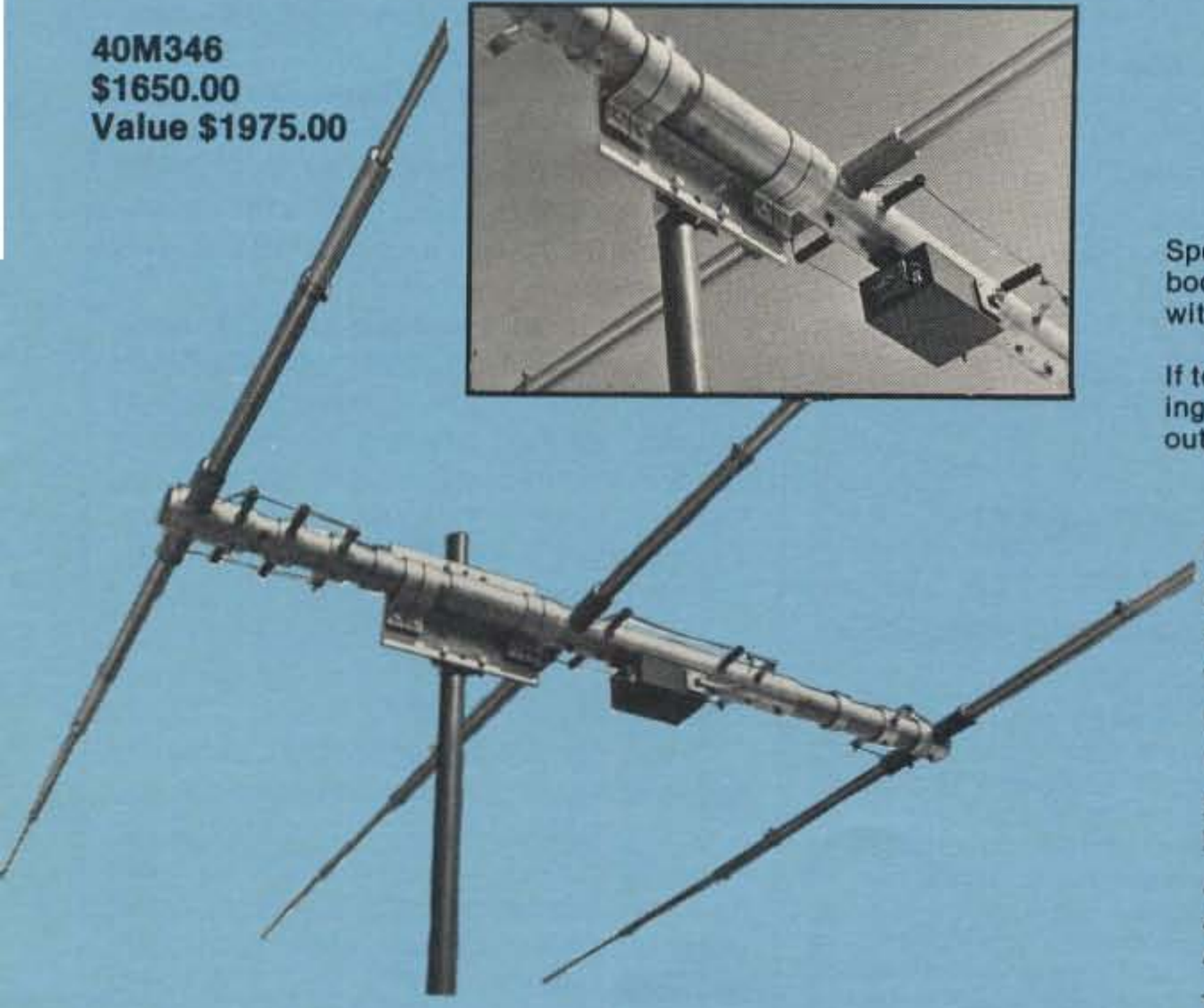

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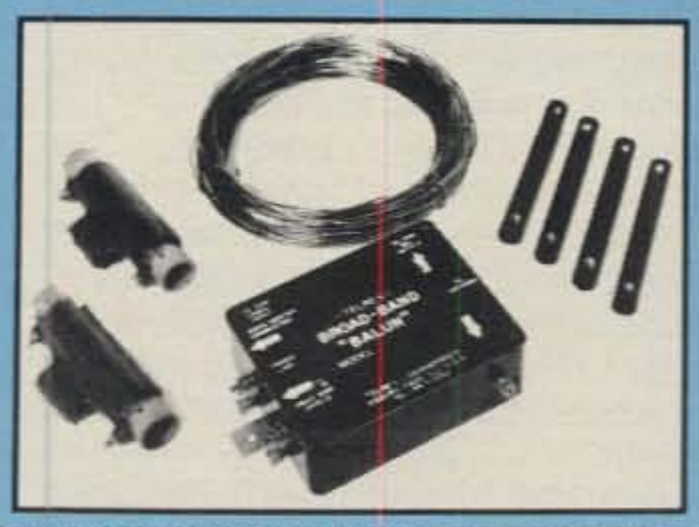

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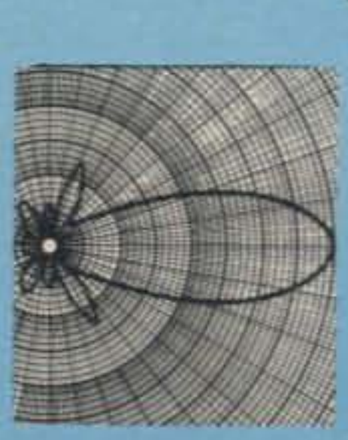

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4,125, and 27,120 kHz; guerillas—8,292 and 26,865 kHz. (Frequencies are listed in order of popularity.) Try your hand at monitoring some of these frequencies while working around the shack or tuning the bands. Chances are good you'll soon uncover some rather unbelievable activities. Heard recently on 13,560 kHz, for example, were various parties laying plans for a simultaneous "push" on "the planned objective" at a certain hour. Timing and coordination with several "operations" was continuously emphasized by the "head man." Call signs and/or identifications of any kind were obviously deleted. It's often interesting to read morning newspapers after listening to such events on the air.

Several other groups have been known to frequent the previously mentioned shortwave "hotspots." This includes mercenary forces and anti-government forces instigating some revolutionary or terrorist maneuver. Latin American areas are continuously infiltrated with these activities, and our geographical area usually produces "arm-chair copy" of those communications. If you think all's quiet in the outside world—that u.h.f. scanner monitoring is interesting—you simply haven't listened to the h.f. spectrum! Check 6,522 kHz between your 40, 30, and 20 meter QSO's. Things may be hotter than you think.

Numbers Stations

One of the more curious activities taking place on lower frequencies in the h.f. spectrum involves so called "numbers" or "spy" stations which transmit 5 digit coded sequences of information. Some of the transmissions are voice; some are via c.w. Some were recently busted, but there always seems to be another "numbers" station taking its place. The purpose and result of "numbers" stations is presently unknown, but their struggle for survival is quite real. Want to try your hand at breaking their 5 digit codes? Bring along your computer and tune some of the following frequencies. Precise frequencies may vary somewhat according to outside influences. Points of origin seem to be between Florida and Columbia.

5814 kHz: Numbers read in Spanish by YL—0240 GMT
7630 kHz: Numbers; 5 digits in Spanish by YL—0210 GMT
7410 kHz: Numbers; 5 digits in German by YL—0420 GMT
7630 kHz: Numbers in English by YL—0210 GMT
9720 kHz: Numbers; 5 digits in English—0410 GMT
5411 kHz: Numbers; 5 digits by Spanish YL—0230 GMT
8417 kHz: Numbers in Spanish—0230 GMT

Maritime and Aeronautical Activities

There are a number of government-established maritime channels situated in the h.f. spectrum, the majority of which support legitimate marine activities. Most of these communications center around calls for parts or sea information and conventional chatter between fishing boats and/or sea-going vessels. Some of the "unknown gang" occasionally appears on or near these frequencies (possibly due to crystal-warping measures). The busiest maritime frequency we've noticed during evening hours is 6521 ±kHz. Check this action some night when 20 meters is lax.

Several major airlines employ h.f. for long-distance and semi-secure communications during flights. Likewise, airports can often be heard communicating with aircrafts during particular occasions. The list of aircraft channels is too extensive for this column, and thus we heartily suggest subscribing to *Popular Communications* magazine for more information. Meanwhile, you might listen for Miami Air on 13,116 kHz during periods of unusual weather, hijackings, etc., and then follow any announced alternate frequencies.

Popular maritime channels and air service frequencies are listed below. The most active frequencies are marked with an *, and all frequencies are in kHz.

Maritime Channels

2,065	6,221*	16,581
2,079	6,521*	16,590
2,096	8,291	16,593
4,125*	8,294	22,124
4,143	12,429	22,127
4,419	12,432	22,130
6,218	12,435	22,133
		22,136

Miami Air—13,116
Unknown Air—10,047*
Skyjacking freqs.—10,093, 13,348, 17,925

Propaganda Broadcasts and Jamming

Ever since the early days of radio, propaganda broadcasts have been used to influence attitudes of the general population. During modern times, these techniques usually take the form of presenting so many tales that listeners become confused about real truths, or presenting sides of an issue oriented toward gaining listener sympathy. We are all subjected to similar concepts, essentially hearing things according to newscasters' viewpoints rather than the straight facts. This situation was the original factor that caused people to monitor shortwave broadcasts from other areas. Bear these facts in mind when tuning the international broadcast bands (such as 49, 31, and 25 meters).

Radio jamming stations are also situated throughout the western world. These raspy-sounding signals may be noticed moving "on top" of transmissions within the first minutes of certain broadcasts. Although jamming can be quite effective, it may often be avoided by using "grey line" DXing techniques.

Potpourri

If the previously described activities haven't piqued your curiosity, maybe you should consider some of the special operations on h.f. RTTY monitoring from news services around the world is a blast. Wireless phone conversations are quite plentiful between 1725 and 1780 kHz (don't believe those 600 range restrictions!). Some people report listening to hundreds of phone calls by connecting the input of an h.f. receiver to a TVRO demodulator's output. That spectrum (500 kHz to 20 MHz) is loaded. Like to hear amateur radio commercials? Tune in WRNO worldwide (they're usually the *strongest* signal on international short-

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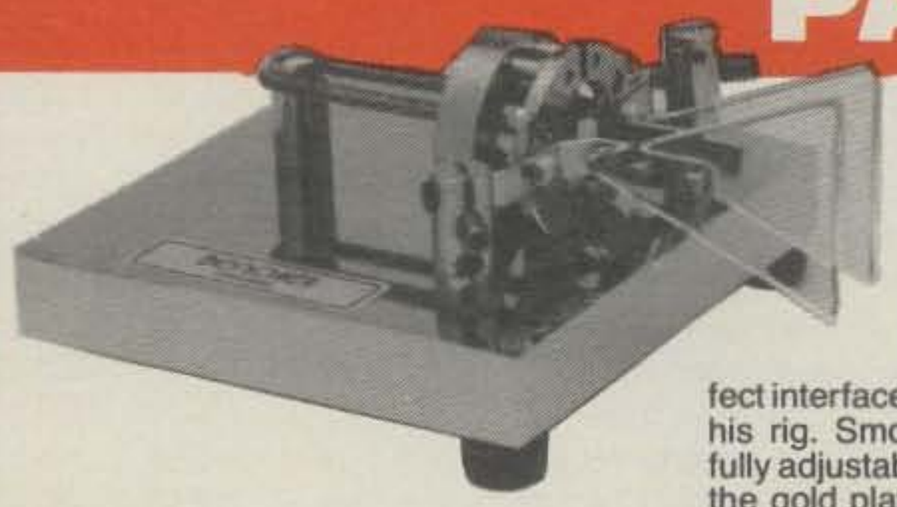

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wave bands). Illegal or Free Radio broadcasts from "pirate" stations frequent the 1605 to 1625 kHz range and the 7300 to 7350 kHz spectrum. Weekend nights are their "hot times."

Conclusion

Through the use of full-coverage h.f. equipment, today's radio amateurs literally have the world at their fingertips. The only true hitch is knowing the right frequencies to tune for the type of action one desires to follow. This situation actually isn't different from ham-band operating; it merely requires (as it did in our early ham-licensed days) reading associated magazines, becoming familiar with popular frequencies, and listening to familiarize oneself with what's happening. If we said OSCAR satellites, for example, you would probably think 29,400 kHz, the mode A beacon frequency. If we said DX, you would probably think 14,200 kHz. Phone patching—14330 and up. Amateur radio and yachts—21425 kHz. SSTV—14,230 kHz. You know the story, and once you've become familiar with activities/frequencies, it's the same for s.w.l.'ing today. Your propagation knowledge is also useful in this area: nighttime communications use low frequencies, while daytime communications use higher frequencies.

Each of us should make a point of becoming familiar with, or at least maintaining accurate lists of, significant activities which may be needed at a future time. We've all heard of in-progress airplane hijackings, of ships in distress being aided by radio amateurs, of countries seizing hostages and sketchy details being relayed by a sometimes confused news medium. If any of these activities happened, would you know what frequencies to monitor?

There is a wide variety of shortwave information presently available through both books and magazines. Leading the way is *CQ* magazine's sister publication, *Popular Communications*. If you haven't yet checked out this magazine, you've missed an absolute treat. There are articles and columns on spy radio systems, underworld radio, unidentified submarines, and much more, complete with operating techniques and frequency lists for each. *Popular Communications'* address is the same as *CQ*'s: 76 North Broadway, Hicksville, NY 11801. Another good information source is the monthly news sheet "Monitoring Times" (140 Dog Branch Road, Brasstown, NC 28902). A very enlightening book worth reading is *How to Tune the Secret Shortwave Spectrum*, TAB Books #1185.

If you would like to be more informed on world situations, on the many happenings of our times, on what's going on behind the scenes, take some time for educated s.w.l.'ing today. It's fascinating!

73, Dave, K4TWJ

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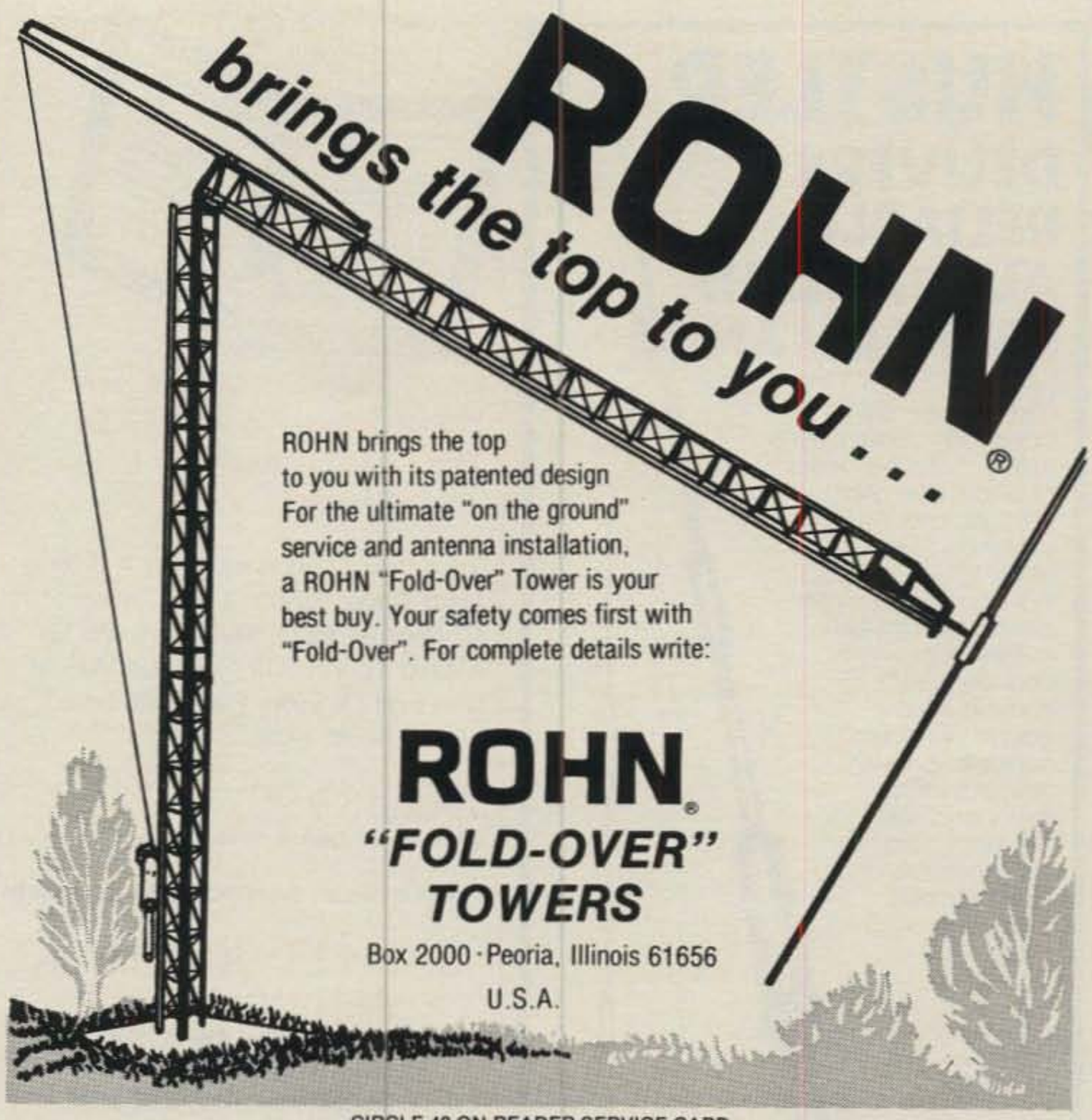

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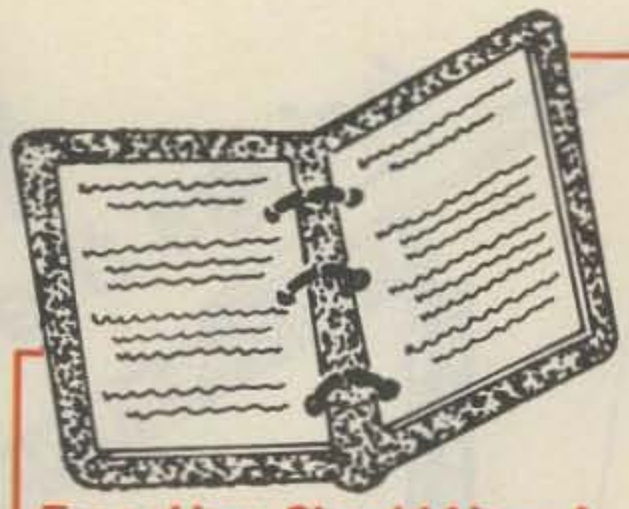

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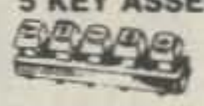
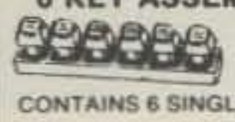

$1.00 EACH
CONTAINS 5 SINGLE-POLE NORMALLY OPEN SWITCHES. MEASURES 3 3/4" LONG

6 KEY ASSEMBLY

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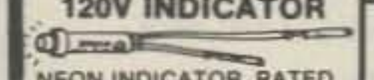
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WANTED: RCA 44 or RCA 77 mike, Vibroplex Blue Racer. John White, 55 Walden, Burnsville, MN 55337.

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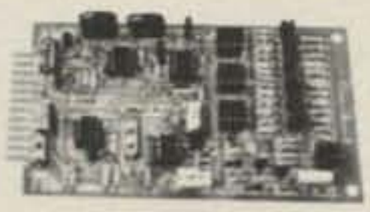

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1 1/8" × .058" × 72"	8.00
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1 3/8" × .058" × 72"	10.25
1 1/2" × .120" × 72"	15.00
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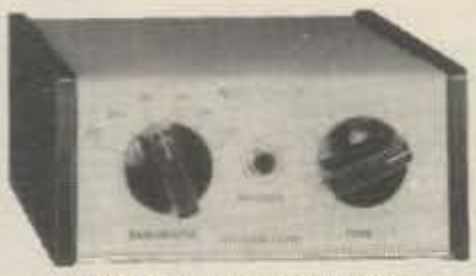
XZ-2 Audio CW Filter

...or any other until you've read our Audio Filter Fact Sheet. Audio filters, unfortunately, lend themselves to some pretty spectacular claims, like "infinitely variable" or "20 Hz bandwidth." Fine, but is this what you really need? Probably not. What about "Q" and ringing? They can be serious limitations in any filter. And, counting knobs on the front panel is no guarantee of virtue either.

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Some of the filters are not all that they seem to be. We think that our fact sheet can help you decide for yourself. Drop us a note, or your QSL. We'll rush the Audio Filter Fact Sheet right out to you.

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WANTED: Home computer VIC-20 or similar, Butternut 160M antenna loading coil, Heath MP-14 power inverter and Heath IM-103 line voltage monitor. Also want solar cells/panel and QRP equip. Tom Coddington, WB6AWC, 7825 Scotts Valley Rd., Lakeport, CA 95453.

WANTED: Heath HG-10B or Hallicrafters HA-5 VFO, Drake 2-C Receiver, Drake 2-NT Manual. Am Novice with 2-NT and would like to get on air. Dennis, KA6YGR, 17 Westwood Ave., Napa, CA 94558.

ALPHA 76PA, mint, 3 tubes, 10-160, $1425. Collins KWS-1 $425. Hy-Gain DB 10/15 3 element duobander $60. Rick, K5UR, P.O. Box 1463, Little Rock, Ark. 72203. Phone 501-988-2527.

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SWAN 102BX, ant tuner, trap vert, key, keyer, Shure 444, all $1000. K5DY, 1145 Queenside Dr., Covina, CA 91722. Phone (213) 967-9965.

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SALE. National NC-105 Receiver, $55. Hallicrafter HT-40 transmitter, $25. WAØNLR, 2931 Central Park #38, Topeka, KS 66611.

WANTED: Don Chesser's OVARA DX Bulletin: Copy No 22 and Numbers 1 thru 6 to complete collection for binding. Jock, ZL2GX, 152 Lytton Road, Gisborne, NEW ZEALAND.

KENWOOD TS-820S, D104, Beam, Key/Keyer, Excellent!! $777. Evan, 66 Tremont, Medford, NY 11763 (516) 289-7368.

HELP: Junior High School 180 would appreciate any old magazines, books, parts and items related to amateur radio. Contact G. Skloot, KE2N, JHS 180, 320 B. 104 Street, Rockaway Park, NY 11694.

FOR SALE: QST from 1930, CQ from 1945, also HR and 73. Want HF transceiver and converted CB. WB4CVH, 805 Pinebook Rd., Eatontown, NJ 07724.

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FOR SALE OR SWAP for transceiver similar to Kenwood 530. Tektronix 585 oscilloscope with dual-trace plug-in and type 82 adapter. W1WEF, 408 Thompson St., Glastonbury, CT 06033. Phone 1-203-633-2756.

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WANTED: MINI-PRODUCTS B-24 Mini-Beam for modification of my HQ-1 quad per August CQ article. Contact WB5MTV, Geoffrey K. Kolb, 1840 Hillcrest Ave., St. Paul, MN 55116.

HA 20 VFO, Dumont 322 Dual Beam Osc., L & N Speedomax G Recorder 0 to 10 MV, $75 each. W2DQC, 229 Sarles Ln., Pleasantville, NY 10570.

SELL: 75S-3C $785, 32S-3 $450, 312B-4 $165, 516F-2 $125. Mint, original owner. Call Walt, N2CPE, 516-427-0052 after 5 pm.

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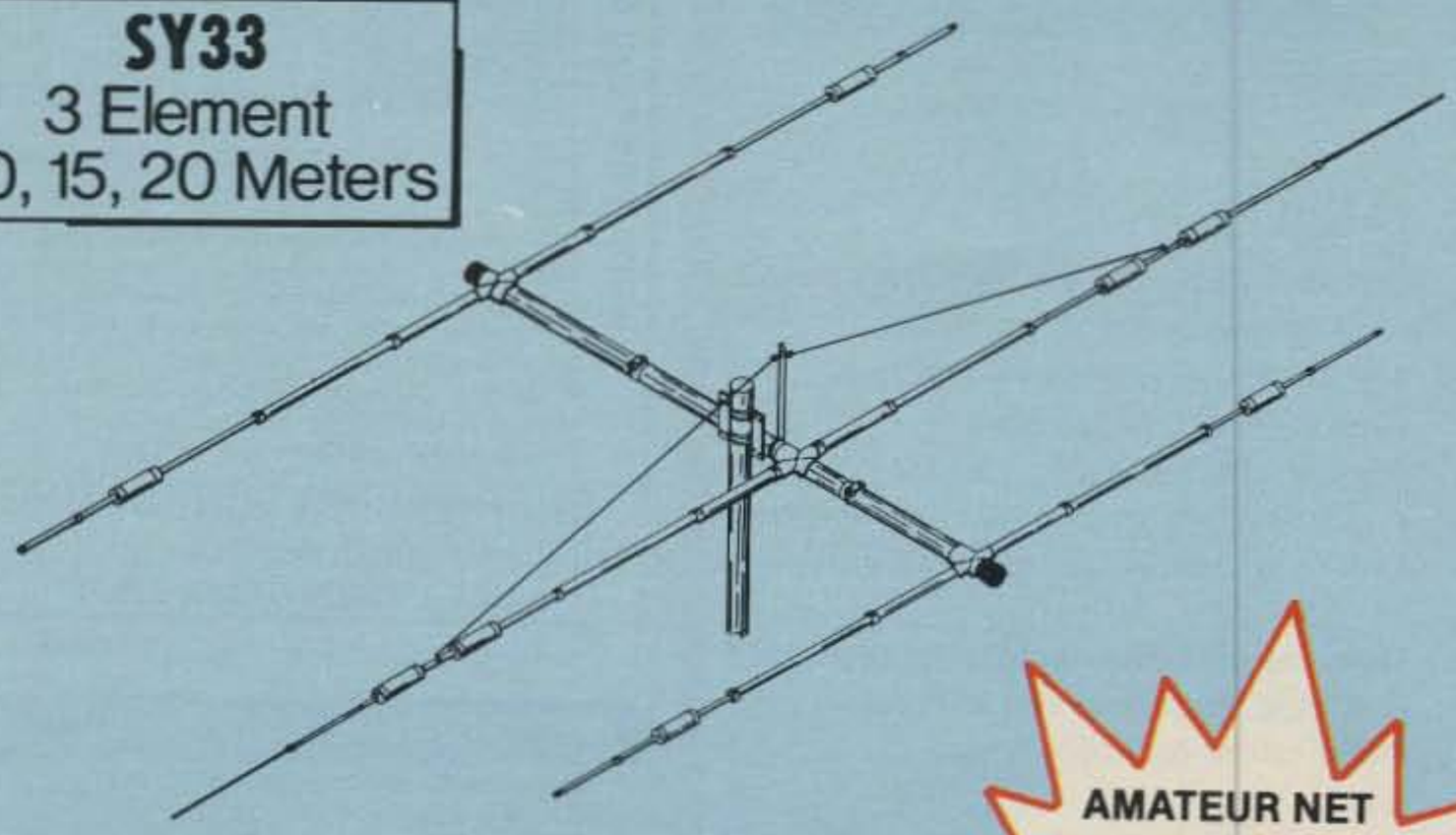

Band MHz:	14-21-28	Longest element:	27'4"
Maximum power input:	legal limit	Turning radius:	15'9"
Gain (dBd):	up to 8 dB	Maximum mast diameter:	2" O.D.
VSWR at resonance:	1.3:1	Surface area:	5.7 sq. ft.
Impedance:	50 ohms	Wind loading at 80 mph:	114 lbs.
F/B ratio:	up to 20 dB	Assembled weight (approx.):	37 lbs.
Boom (O.D. x length):	2" x 14'4"	Shipping weight (approx.):	42 lbs.
No. elements:	3	Direct 52 ohm feed no balun required	
		Maximum wind survival:	100 mph

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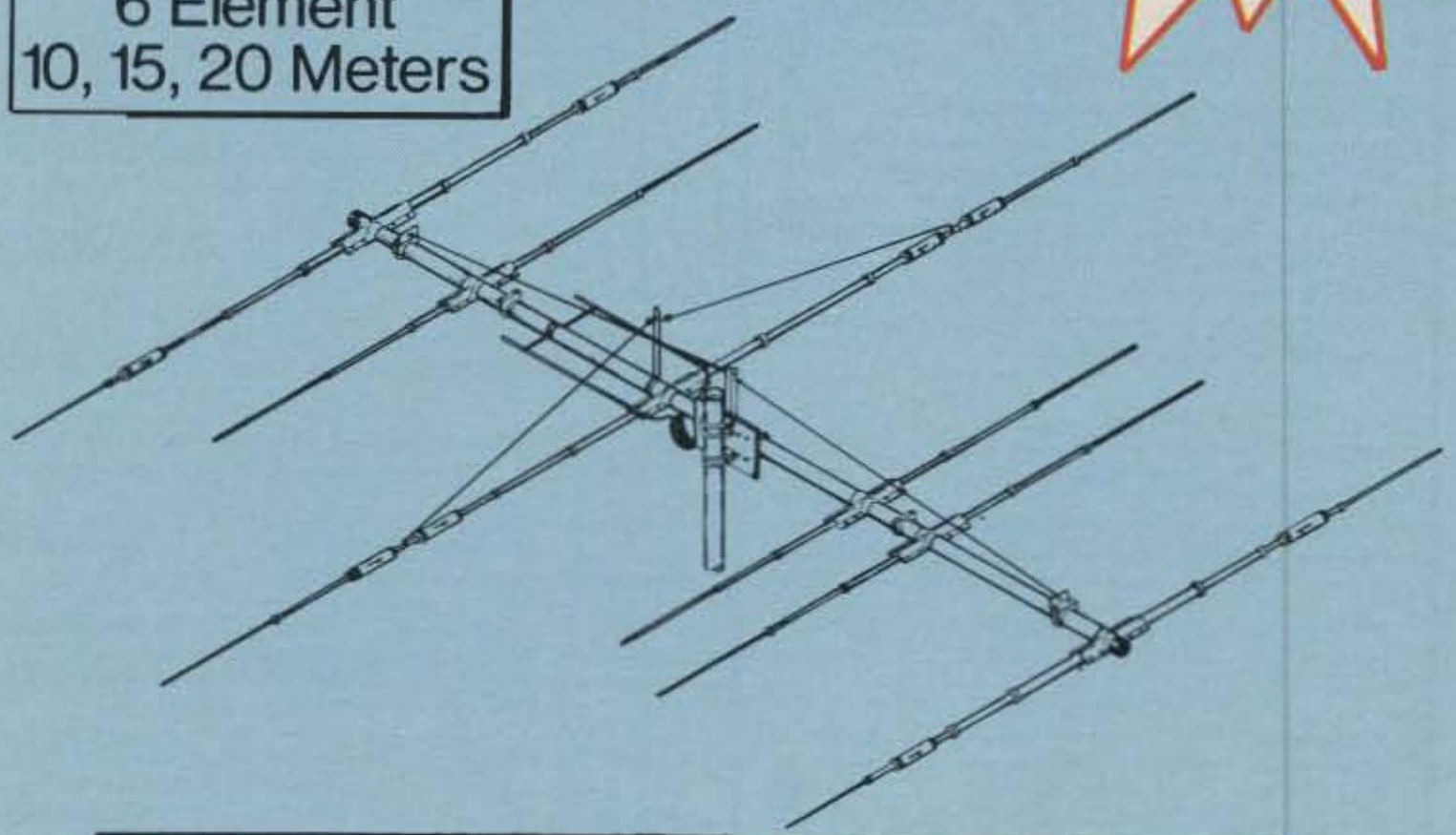

Band MHz	14-21-28	Longest Element:	29'6½"
Maximum power input	legal limit	Turning radius	19'1"
Gain (dBd)	up to 9 dB	Maximum mast diameter	2" O.D.
VSWR at resonance	1.1:1	Surface area	8.6 sq. ft.
Impedance	50 ohms	Wind loading at 80 mph	215 lbs.
F/B ratio	up to 20 dB	Assembled weight (approx.)	53 lbs.
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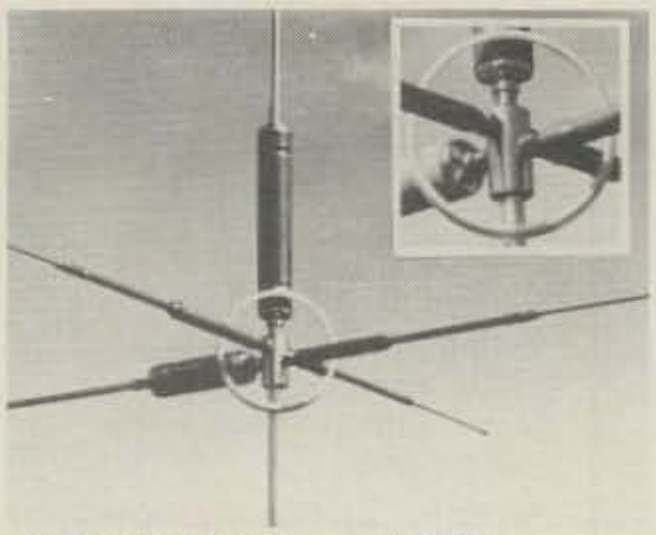

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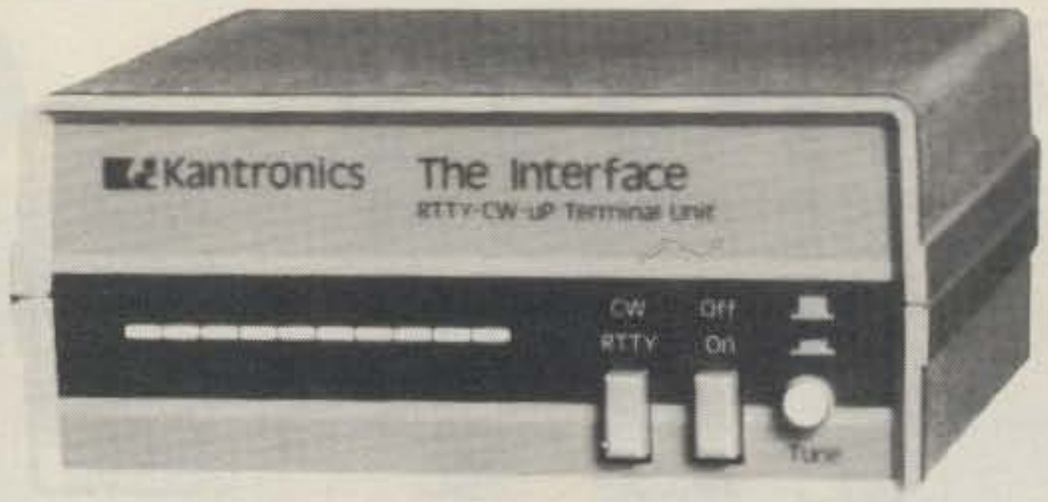

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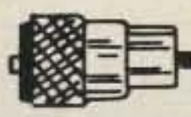

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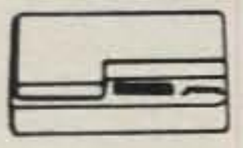

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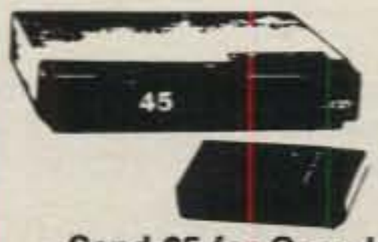

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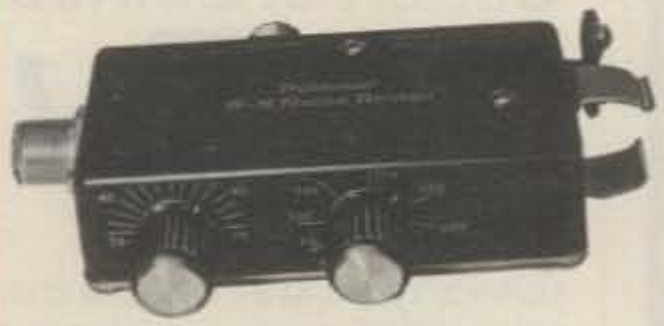

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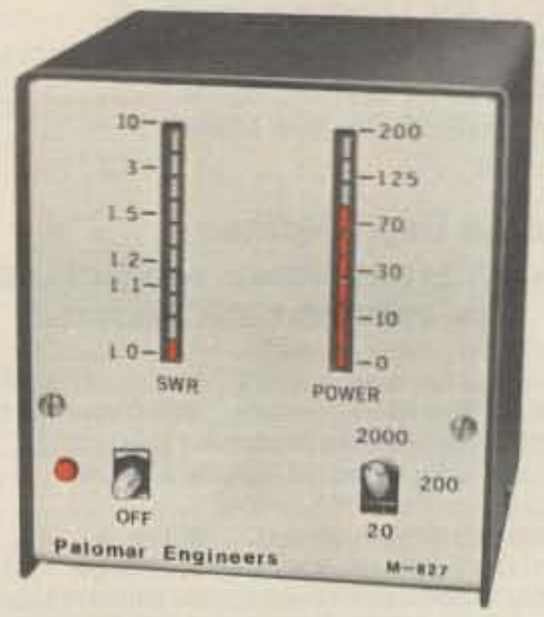

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Receiver. Utilizing an ICOM developed J-FET DBM, the IC-751 has a 105dB dynamic range. The 70.4515MHz first IF virtually eliminates spurious responses, and a high gain 9.0115MHz second IF, with ICOM's PBT selectivity. A deep IF notch filter, adjustable AGC and noise blanker (can be adjusted to eliminate the woodpecker), audio tone control, plus RIT with separate readout provides easy-to-adjust, clear reception even in the presence of strong QRM or high noise levels. A low noise receiver preamp provides exceptional reception sensitivity as required.

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CWN: FL52A, FL53A
AM: FL33

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